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ABSTRACT

Written with classroom teachers in mind, the learning module presents information and activities for youth to learn to shoot a bow safely and to develop reasonable skill with the bow and arrow. Ten objectives to be achieved at the completion of instruction include: identifying parts of the bow and arrow; defining such terms as recurve bow, end, round, high and low anchor; describing and demonstrating proper form when shooting, safe shooting procedures, and stringing and unstringing a bow; and shooting a modified round with success. Guidelines are provided for adapting archery equipment and instruction for mentally retarded and hearing/visually/orthopedically impaired students. Twenty rules of safety are addressed and emphasized for importance in teaching archery. The subject information includes archery equipment, class size, range layout, preliminary classroom instruction mimetics, learning to shoot, scoring and rounds, and novelty events. Ten 60-minute lesson plans are arranged so instructors may only use the first five lessons if time does not permit. Each lesson lists equipment and materials needed for activities. A suggested written test and skills test are provided to evaluate students' mastery of material taught. A glossary of archery terms, bibliography of references and suggested teaching aids provide additional information. (ERB)

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BASIC ARCHERY

ARCHERY SKILLS SERIES

A PROGRAM OF THE MISSOURI DEPARTMENT OF CONSERVATION

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OUTDOOR SKILLS EDUCATION MODULES

Missouri's natural resources belong to all its citizens. More and more people are going outdoors to hunt, fish, boat, hike, camp, explore, and learn about nature. The skills they use in the outdoors can have a direct effect on resources. That's why it is important to educate youth and adults in how to use the outdoors wisely and responsibly through schools, community groups, and agencies.

The Outdoor Skills Education Unit of the Department of Conservation, in cooperation with the Department of Elementary and Secondary Education, is developing educational programs to teach Missourians how to use wisely and skillfully the state's many resources for outdoor recreation. The materials, presented as modules, can be used individually or combined in a series by schools, camps, clubs, scouting groups, and other youth or adult organizations. Topics include the shooting sports, casting and angling, trapping, archery, backpacking, camping, aquatics, map and compass, and other skill areas.

Each module is a self-contained unit that includes information on the subject, lesson plans, activities, class exercises, tests, suggested visual aids, and references. Experienced instructors who have taught the subjects and successfully used the activities have written the modules.

For additional information on conservation and outdoor education programs, write the Education Section, Missouri Department of Conservation, P.O. Box 180, Jefferson City, MO 65102.



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INSTRUCTOR MANUAL

BASIC ARCHERY

ARCHERY SKILLS SERIES

MISSOURI DEPARTMENT OF CONSERVATION
EDUCATION SECTION

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About the author

Dorothy Walker is assistant professor in the division of physical education at Northwest Missouri State University. As well as teaching archery, she has coached it as a club and team sport for several years.

In 1968, Dorothy was selected to be one of the American Archery Council's first certified archery instructors through the Outdoor Education Project, founded by Dr. Julian Smith. The American Archery Council sponsored archery clinics throughout the country to give instructors the most recent teaching techniques. Many of these clinics were in conjunction with the Lifetime Sports Project of the American Association of Health, Physical Education, and Recreation. Since 1970, Dorothy has taught these archery clinics for the states of Missouri, Colorado, Mississippi, Arkansas, Nebraska, Iowa, Oklahoma, Kansas, and Texas. She has an instructor rating from both the National Archery Association (NAA) through The World Archery Center and The National Field Archery Association (NFAA).

Dorothy holds B.S. and M.Ed. degrees from the University of Missouri-Columbia. In addition, she has done graduate work at Texas Women's University, the University of Nebraska at Lincoln, and Washington University. She is listed in *Who's Who in American Women* and *Who's Who in the Midwest*.

The author wishes to express particular appreciation to the late Dr. Julian Smith and Dr. Fred Schuette, directors of the Outdoor Education Project, and to Ed and Myrtle Miller, directors of The World Archery Center (formerly Teala-Wooket Archery Camp). These people gave the author guidance and encouragement through the years and are responsible for most of her philosophy and knowledge.

For assistance in developing and permission to use material in writing this module, the author wishes to express appreciation to several individuals and organizations:

Clayton B. Shenk and Jesse King of the National Archery Association,

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Dr. Wayne McKinney for writing the history section,

Archery Today and *Archery* magazines for information included in the module,

The American Alliance for Health, Physical Education, Recreation, and Dance for excerpts from their instructional material entitled *Archery*,

Walter Powell for background material on the flight of an arrow,

Myrtle Miller for the use of mimetics material,

Rick Flint for writing the section on adaptive equipment,

James W. Hosford for the bow rack design.

How to use this module

This module has been produced for you who teach or work with youth. The material has been written with the classroom teacher in mind, but it also can be adapted by leaders of camps, 4-H clubs, scouting organizations, and other youth groups. A variety of information and activities has been included to make the module useful to as many groups as possible. It may be used individually or combined with other modules for a more extensive course.

The Basic Archery module contains:

Introductory Information—Questions such as “Why teach this subject?” are answered. Goals and objectives approved by the Missouri Department of Elementary and Secondary Education are established. A brief history of the subject is given as background and a means of introducing the subject.

Safety—This module addresses the subject of safety and its importance in teaching archery. Twenty rules of safety are included.

Subject Information—This section provides the information necessary to teach students the basics of archery. Included is information on archery equipment, class size, range layout, preliminary classroom instruction, mimetics, learning to shoot, scoring and rounds, and novelty events.

Lesson Plans—Field-tested methods of teaching this material are provided in 10 lesson plans. They are arranged so an instructor may use only the first five lessons if time does not permit 10 lessons. The time for each lesson is only suggested and will vary with instructors. Equipment and materials needed for the activities are listed.

Student Handouts—A handout on archery equipment is included.

Suggested Written Test—If you are a classroom teacher and want to evaluate your students' mastery of the material you have been teaching, a sample written examination is included along with a suggested skills test. Test questions are keyed directly to the objectives for the module.

Glossary and Bibliography—These are provided as additional information which may help in teaching the subject in more detail.

Outdoor Skills Education Specialists are assigned to eight regions throughout the state. They will assist you in obtaining materials and scheduling equipment and films that are available from the Department of Conservation. Check the last page of this module for names, addresses, and regions.

Assistance also is available from several archery organizations, which are listed in the bibliography. Training may be obtained through some of these organizations as well as the Department of Conservation.

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The material in this module has been reviewed by the following people:

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Questionnaire

Please help us evaluate the effectiveness and use of our materials by completing the following questionnaire and mailing it to the Missouri Department of Conservation, Outdoor Skills Education, P.O. Box 180, Jefferson City, MO 65102.

How did you obtain a copy of this module? _____

Have you used this material?
Why or Why not? _____

Your position: _____

Age group you teach _____

CONTENT AND FORMAT

Were you given enough information to teach this course? _____

Enough_____ Not Enough_____ Too Much_____

Comments: _____

Was material presented in a manner easy for you to use? _____

Yes_____ No_____

Comments: _____

What information would you add or subtract? _____

LESSON PLANS AND ACTIVITIES

Did you use the lesson plans? _____

All of them_____ Some of them_____ None of them_____

Were the time periods allowed for activities adequate? _____

Adequate_____ Too much time_____ Not enough time_____

Comments: _____

Which activities did students most enjoy? _____

What additional activities would you include? _____

What suggestions do you have for future modules? _____

What topics would you like to see covered? _____

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Topic Outline

Introduction

- I. History
- II. Ethics
- III. Safety
 - 20 rules of safety

Archery Equipment

- I. Bow
 - A. Design
 - B. Draw weight
 - C. Length
 - D. Material
 - E. Number
- II. Arrows
 - A. Design
 - B. Length
 - C. Material
 - D. Number
- III. Accessories for Each Bow
 - A. Bow sight
 - B. Bowstring
 - C. Arrow rest
 - D. Nock locator
- IV. Accessories for Each Student
 - A. Arm guard
 - B. Quiver
 - C. Finger tab
- V. Range Layout
 - A. Targets
 - 1. material
 - 2. number
 - B. Target stand
 - C. Target faces
- VI. Equipment Storage
 - A. Bow rack
 - B. Bow and arrow cart
- VII. Care of Equipment

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- I. Finding the Dominant Eye
- II. Measuring Arrow Length
- III. Preparing the Bow to Shoot
 - A. Stringing
 - B. Unstringing

Mimetics

- I. Mimetics Without Equipment
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 - A. Nocking arrow without an arrow
 - B. Practicing string alignment

Learning to Shoot

- I. Bow Hand Position
- II. Nocking Arrow and String Hand on String

- III. Bow Arm and Draw
- IV. Anchor
 - A. High anchor
 - B. Low anchor
- V. Aiming
 - A. Instinctive
 - B. With a bow sight
- VI. Release and Follow-through
- VII. Retrieving
- VIII. Achieving Success
 - A. Left arrow
 - B. Right arrow
 - C. Low arrow
 - D. High arrow

Scoring and Rounds

- I. Scoring
 - A. Field archery
 - B. Target archery
- II. Rounds
 - A. Indoor FITA round
 - B. Animal round
 - C. 20-yard flint round

Novelty Events

- I. Clout
- II. Archery Golf
- III. Shooting at Balloons
- IV. Modified Field Range

Introduction

Goal of the module

To learn to shoot a bow safely and to develop reasonable skill with the bow and arrow.

Purpose of the module

While your students may have had some experience with a bow and arrow, most will not be accomplished archers. This basic archery module cannot turn them into expert archers. It can, however, be the means of teaching basic skills that will enable them to continue in the sport, if they want to put forth the effort. Modules on Bowhunting and Bowfishing are planned for future publication. These advanced courses will take students beyond the target range to field and stream and further increase their enjoyment of the sport.

By the end of this archery course, students also should have learned how to provide for their own and others' safety, how to maintain the necessary equipment, and how to care for the shooting area.

Content of the module

This module contains material for a basic course in archery. Many other sources of material are available to supplement what is presented here.

To instruct this course, you must be an archer. You may further develop your skills by joining clubs, visiting with other archers, and consulting with other archery instructors. It is recommended that you take at least one instructor's course before using this material. Information on instructor's programs is available from the following organizations:

Missouri Department of Conservation
Outdoor Skills Education
P.O. Box 180
Jefferson City, MO 65102

Missouri Department of Elementary and Secondary
Education
P.O. Box 480
Jefferson City, MO 65102

National Archery Association
1750 E. Boulder
Colorado Springs, CO 80909

National Field Archery Association
Route 2, Box 514
Redland, CA 92373

The World Archery Center
Marshalls Creek, PA 18301
Mr. and Mrs. Ed B. Miller
Executive Directors
67 Old Stone Church Road
Upper Saddle River, N.J. 07458

This basic archery module is adaptable to either 5 or 10 one-hour classes. Additional activities are provided so that the course can be expanded to more than 10 lessons.

When introducing a basic archery course, provide your students with some of the history of archery and emphasize that it is an Olympic sport and also is used for bowhunting and bowfishing. Bowhunting is becoming an increasingly popular recreational pastime in Missouri. Find out if there are any archery-related activities in your community and let your students know about them.

Few Missouri communities have contact with both the National Archery Association and the National Field Archery Association. For this reason, two modified rounds (using shorter distances and larger targets than regulation rounds) are included in this module. One round uses a simple target face and NAA scoring. Both sets of rules are reprinted in this module with the permission of the National Archery Association and the National Field Archery Association. By having contact with rounds from both organizations, you will be better able to adapt to any situation. Your students should know about the NAA, NFAA, and other archery organizations which have helped promote the sport in this country.

Novelty events are included in this module to allow students to have a nonpressure session that will be fun. Such an experience often creates a favorable climate for more serious application in the next lesson. Novelty events are also a good way to end the course.

End: A certain number of arrows shot before retrieving.

Round: A certain combination of ends shot at certain distances.

Remember: A safe class is a successful class.

Objectives

At the completion of the instruction, the student should be able to do the following:

1. Identify sight window, finger tab, stringer, arrow tip, crest, index or cock feather, bowstring, string height, nock locator, arrow nock, arm guard, and quiver.
2. Define the following terms: recurve bow, end, round, high anchor, low anchor.
3. Identify between which two fingers an arrow is drawn.
4. Specify the score for each ring on a blank target.
5. Write a short essay discussing how archery fits into outdoor skills today.
6. Describe and demonstrate how to use safe shooting procedures on an archery range.

7. Demonstrate how to string and unstring the bow.
8. Demonstrate how to properly remove an arrow from the target and from the grass.
9. Demonstrate proper form when shooting by coming to a complete draw at a proper anchor with bow, hands, and arms in proper placement. The release should be smooth.
10. Shoot a modified round with some degree of success. (Since only two shooting sessions are scheduled before scoring, a score of 20 percent of the total possible could be considered successful. While this may be a goal, students should be reminded that form, safety, and fun are equally important.)

History

Editor's Note: This brief summary of the history of archery was written by Dr. Wayne C. McKinney, professor of Health and Physical Education at Southwest Missouri State University in Springfield. Dr. McKinney is author of the book Archery.

Historians usually cite the control of fire, invention and utilization of the wheel, and speech development as important factors in the emergence of mankind. Archery skill also can be added to the list. Without the skills associated with making and using bows and arrows, it is unlikely that primitive people could have survived in their hostile environments. The fact that they did survive gives significant credence to their abilities as skilled bowyers and bow hunters. Pictorial and written records about archery exist in virtually all cultures and societies. Like fire, wheels, and speech, archery was an important survival mechanism for human beings throughout the centuries.

It is impossible to document the exact time when human beings started using bows and arrows as weapons for providing food and for their own protection. The bows and arrows made by primitive bowyers have degenerated since they were usually made from wood and other biodegradable substances. Arrowheads made from stone, however, have been analyzed for age by using carbon testing techniques. The results indicate that humans probably started developing bows and arrows at least 10,000-20,000 years ago during the Upper Paleolithic Period.

Numerous cave drawings in Spain and southern France depict archers hunting and fighting. One of the more noteworthy drawings is a Mesolithic hunting scene at Los



Caballos, Valltorta, Spain, which shows a highly organized group of bowhunters shooting at a herd of deer.

Archery has been a frequent subject in literature and art throughout history and has given rise to myths in numerous cultures. The mythology of ancient Greece includes outstanding archery accomplishments by such famed characters as Apollo, Diana, Hercules, and Eros (Cupid). The English had their Robin Hood, and ancient cultures in China and Japan also had legendary archery heroes.

Archery has also been linked with many religious ceremonies. The ancient Assyrians concluded a religious ritual by "shooting an arrow into the sun." An analogous ritual, the sun vow, was practiced by American Indians many centuries later. The practitioners of Zen Buddhism have long used the act of releasing an arrow to bring the "mind" and "body" together in a spiritual state known as *Satori*.

The Egyptians are known to have trained archers for combat about 5000 B.C. Their superior archery skill helped them win freedom from Persian control. Prior to this time, it is believed that spears and slings were the primary propulsive war weapons. About 1000 B.C., the Persians trained their warriors as horse-mounted archers. This brought another dimension to the use of the bow and arrow as a weapon of war, one that would be used extensively for centuries.

History is filled with the uses of archery in wars. Between 850-950 A.D., the Vikings shot arrows in great numbers as a form of naval bombardment prior to their amphibious landings. The same strategy has been used with more sophisticated weaponry during wars in this century. The archery sport of clout shooting evolved from the Viking's use of arrows to bombard their enemies.

Genghis Khan's "Golden Horde" (1220 A.D.) was composed mainly of archers on horseback, which gave him the mobility to capture territory from the Pacific Ocean to the Volga River, and from the Caspian Sea to Northern Siberia. Many of the Japanese samurai warriors were also trained as mounted archers. They wore elegant uniforms with horned helmets, and their long bows were seven feet or more in length. The length of the bows made them cumbersome, which made the archery skill of the samurai warriors even more amazing.

English history from 1066-1471 A.D. documents numerous battles in which archery skill played a vital role. The English lost the Battle of Hastings in 1066 because they were tactically outclassed by the Saxon and Norman archers. The famous Bayeux Tapestry was made by women whose loved ones fought in the Battle of Hastings.

In the fourteenth and fifteenth centuries during the period of the Hundred Years' War, Edward III ordered his subjects to develop their archery skills. Those skills had a

dramatic effect upon the outcome of battles at Crecy (1346), Poitiers (1356) and Agincourt (1415). Shakespeare wrote about the superiority of the English archers at Agincourt in his *King Henry V*. Archery skills also were important in the War of the Roses, fought between 1455-71. Firearms were beginning to be used, however, and the importance of the bow and arrow as a weapon of war was declining.

Archery skills still were used in combat through the sixteenth century. Historians usually cite the Battle of the Spanish Armada (1588), however, as the turning point when more sophisticated firearms began to be used. Still, the bow and arrow remained a significant weapon for protection and hunting for the next 400 years. Archery skills continue to be used by some aboriginal tribes in Australia, New Guinea, South America, and Africa. Indian tribes of North America were highly skilled bowyers and archers and used their skills into the twentieth century.

The evolution of the "atomic age" unfortunately has not eliminated war. Even the most modern weaponry has not completely eliminated archery skills as a military alternative in combat. Archers have been used in more recent wars on a highly specialized basis. Some special forces of military units are still trained to kill and demolish quietly, and use of the bow and arrow is effective for such tasks.

During the last few years, archery has been used primarily for sport. It became an Olympic sport in 1972, and continues to be a popular means of hunting and fishing. Archery is important today for the recreational pleasure it provides those who enjoy competing, hunting, or fishing with a bow and arrow.

Ethics

An instructor who appreciates what archery can do instills values by example, as well as words. Respect is emphasized. Students must respect themselves, their equipment, their fellow archers, their instructor, and the people who will use the shooting equipment and range area after them.

When teaching archery, proper safety regulations must be adhered to at all times so no one is endangered. Students who later become target archers will be *safe* archers; those who become spectators at meets will be *safe* spectators; and those who bowhunt will be *safe* hunters.

Students should learn to practice conservation of equipment, of the shooting area, and of any area used for novelty events. This aspect of respect is meant to continue

throughout life and is evidenced by behavior such as repairing equipment before it is broken and leaving an area in at least as good a condition as it was before being used. (Respect demands, for example, no littering.)

Students who become bowhunters will respect the land on which they hunt and the owner of the land; but, above all, they will respect the animals they hunt.

Safety

The first priority in teaching archery is safety, then fun. In a safe environment students are able to relax and enjoy the fun of the sport. Control of the class by the instructor, therefore, is an absolute *must*, so that students will follow the safety rules. Carelessness may develop as students become accustomed to shooting and are intent upon the draw and sighting, tending to forget everything else.

As the instructor, you should require your students to check their equipment before shooting, during shooting, and after shooting since improper or damaged equipment can cause serious injuries.

String clearance needs to be emphasized during all early shooting sessions to prevent bruised arms, shoulders, breasts, or chests. Remind students throughout the lessons to check their stance and bow arm. Call their attention to three errors that can pull the bow arm into the string path: (1) unequal pressure on either side of the V on the bow hand, (2) not rotating the bow-arm elbow down and out, (3) allowing the bow shoulder to "float" forward on the draw. Make sure all students wear arm guards. Long arm guards should be available for students experiencing problems with string clearance (usually students having a hyper-extended elbow).

Safety Rules

Some general safety rules are given here. You should look over the shooting area to determine what rules apply to that particular situation and require students to abide by those rules. Emphasize that students not only must follow the rules themselves but must help each other to do so.

1. Primary rule: An arrow nocked and drawn is as dangerous as a loaded gun. For this reason, you should not allow a student to nock an arrow until the range is clear and the signal is given.

2. Never shoot at a target when the range behind the target is unclear because someone may be in the area.

3. The shooting line should be the same for all archers. If several archers are shooting at targets from varying distances, the targets should be moved.

An arrow nocked and drawn is as dangerous as a loaded gun.

4. Target and indoor field archers should have one foot on each side of the line. Outdoor field archers should toe the line with the bow-side foot forward. Whether students straddle the line or stand behind it, it's important that everyone be in the same position in relation to the shooting line for two reasons: (1) It is a more definite measurement. (2) It is not recommended to shoot from a further distance than a neighboring archer. Check that your students are in a straight, even line and not staggered. It is recommended that young or inexperienced archers use the field archery rule and stay behind the line.

5. Assign beginning archers arrows that are long enough to allow for a possible overdraw.

Always check equipment before shooting.

6. Check the tackle before shooting. Emphasize that archers are responsible for checking to see that their equipment is safe and in good shooting condition. Particularly check the condition of the bow, the bowstring (if suspect, replace it so it will not break during the shooting), and the arrows (nocks, points, fletching).

If the arrows are wooden, check for fine-line cracks. If cracks are found, break these arrows and throw them away.

Be sure that bows are strung correctly. The bow square should be used by archers each shooting period to check string height and nocking point position.

7. If equipment must be shared, have the partner who is not shooting help coach. This person stands behind the archer, stepping a foot to the side to observe the front of the archer. Tell the partner what specific safety features to check, such as the string clearance from the chest and arm during the first few lessons.

Always keep a watchful eye on your archers and do not assume that their partners are checking.

8. The *shoot* signal (one whistle or the word "shoot"), the *retrieve* signal (two whistles or the word "retrieve"), and the *emergency* signal (three whistles or the word "halt") should be discussed before any shooting is begun. Upon hearing the emergency signal, archers should immediately let down their bows, place arrows in quivers, and step back from the line.

9. Students must use finger tabs and arm guards.

10. Insist on quiet during shooting. Do not let students play around. Archery is more enjoyable if no one gets hurt.

11. On the practice draw, double-check each student to be sure the arm or chest does not interfere with the bowstring. Do not allow any arrows to be shot until archers learn to check for form. If necessary, assign a longer arm guard to anyone whose elbow may be in danger.

12. A bow should never be fully drawn and released without an arrow. This will damage the bow. An experienced archer lets down if the draw is not correct and starts again.

13. Caution students that if an arrow drops in front of

Never draw and release a bow without an arrow. To do so will damage the bow.

the shooting line, it is not to be picked up until the signal is given to retrieve arrows.

14. An archer who has shot the designated number of arrows should step back one step from the line. The instructor stands at the end of the shooting line and looks down it. *Only* when the line is clear do you assume that everyone has shot and then give the signal to retrieve.

15. When the signal to retrieve is given, students should walk, not run, to the target. They should watch the ground as they go to find arrows that have fallen short. A safe method is for the instructor to walk in front of the class to the target.

16. Students should not touch the target or arrows until arrows are scored and other archers are safely to the side of the target.

17. Before looking for lost arrows on an outside range, place the bow across the target. No one should shoot at a target marked in this way.

18. Wear proper clothing. Floppy sleeves, unbuttoned jackets, pins on the bow side of the chest, buttons on the pockets, overalls with bibs, and pens in pockets on the bow side should not be part of an archer's clothing.

For girls, large circular earrings for pierced ears should be avoided, too, because they can be caught by the string hand on the follow-through. Long hair should be pulled back and held with a rubber band or other fastener.

Students should wear shoes in case they step on unseen objects in the grass.

19. Events away from the regular shooting area must be conducted with special care. Students may forget proper procedures in novelty event or game situations. Be sure they understand completely any directions you have given them.

20. Be sure previous steps are mastered before going on to another step. Be alert to potential problems at each step. Explain to your students if there is a particular problem involved. The few injuries that do occur, do so as a result of haste or acting without proper care.

If you have a young class it is recommended that you divide the class. The partner behind the shooter should hold the arrows. *Only* when directed to do so does this partner hand *one* arrow to the shooter. This prevents an overly eager student from nocking the arrow prematurely.

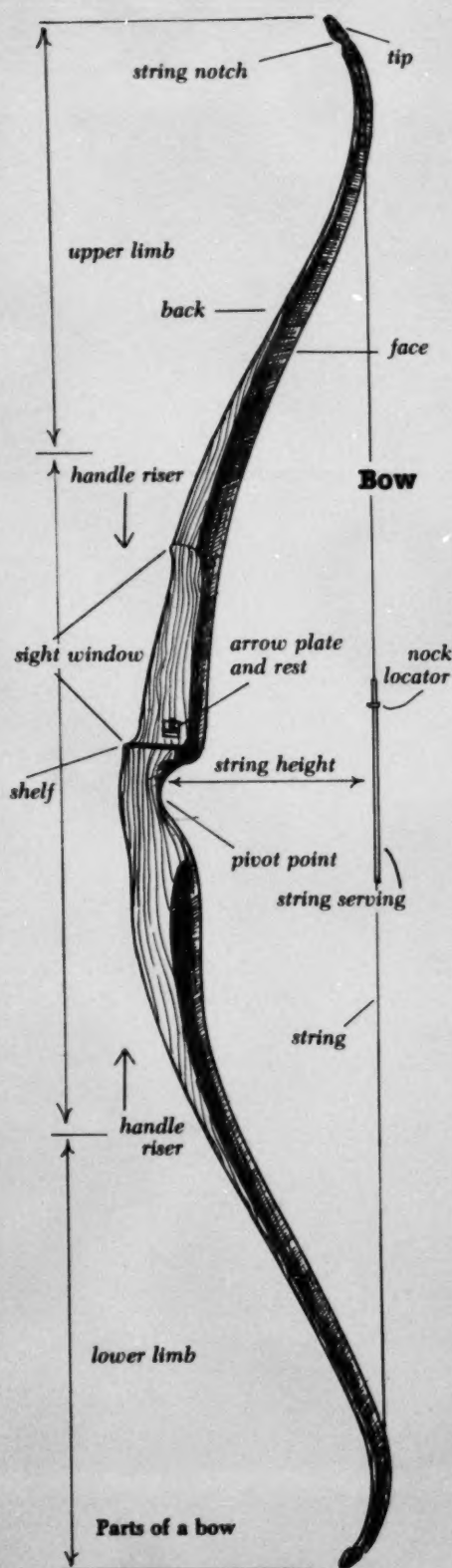
Proper clothing is important.

Events away from the regular shooting area must be conducted with special care.

Never allow an arrow to be nocked unless all conditions are safe.

Do not allow students to do anything with the equipment except what they have been directed to do.

Archery Equipment



For best results, class size should be limited to 10 students. If it is necessary to have more than 10, students should be paired as partners, one shooting at a time.

Simple equipment, as described here, is adequate for a basic archery course. As the instructor, however, you should learn as much as possible about equipment, its use, and how to improve the tackle already on hand. Visits with other archers, archery lane operators, and manufacturers are helpful. Literature about equipment also is recommended (see the listing at the end of this module). For example, Walter B. Powell's series on arrow flight in *Archery* magazine is excellent.

DESIGN

The simplest and least expensive bows for teaching beginners are straight and recurve bows. Well-made bows that can be used by both left- and right-handed archers are difficult to find. Recurves with a sight window are recommended instead. The sight window is cut out on the arrow side of the bow to give better arrow flight, therefore these bows must be purchased for either right- or left-handed archers. Since the majority of archers are right-eye dominant and, therefore, shoot right-handed, more right- than left-handed bows should be purchased for a class (about 7-10 percent for left-handed).

Three-piece bows are becoming popular with instructors. The cost of these bows in many cases is less than the conventional one-piece bow. Should a three-piece bow become damaged (usually the limb), only that piece needs to be replaced, which saves replacing the complete bow. Extra left-hand handle sections can be purchased. By using existing limbs on the left-hand handle section you can save half the cost of a complete left-handed bow.

Compound bows are not recommended for the typical beginning class, although some suitable inexpensive compounds are available.

DRAW WEIGHT

For most children, 15- to 20-pound bows are recommended and 20- to 30-pound bows for most older students, including adults. (This weight will be sufficient for the distances used in this module.) The weight indicated on a bow is for a 28-inch draw, unless otherwise indicated (see page 30 for how to measure draw length). For the student with something other than a 28-inch draw, add or subtract approximately 2 pounds for each inch above or below this to give the approximate true draw weight the student is drawing.

For example, a student using a 25-pound bow, but

whose draw length is 30 inches, will be shooting a 29-pound bow. Another student, using the same bow, but with a 26-inch draw length, will be shooting a 21-pound bow. The bow will be labeled 25 pounds for a 28-inch draw.

LENGTH

A recurve bow should be 60 to 68 inches in length. A tall archer with a long draw will use the longer bow.

MATERIAL

Fiberglass is usually the cheapest and is generally adequate for a simple, beginning class. Laminated bows, made of more than one material, are usually more expensive, but are also more efficient.

NUMBER

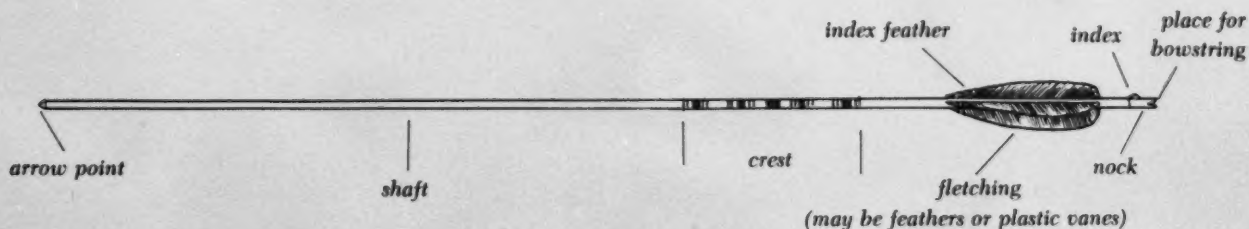
There should be at least one bow for every two students. Preferably, each student will have a bow. Bows should be identified in some way so that a student can always use the same bow.

Arrows

Rule of thumb: The heavier the bow, the stiffer the arrow for correct flight.

DESIGN

Target arrows with three feathers or vanes are recommended. The arrows need to be matched and spined correctly so that each arrow flies the same and works correctly with the bow. When purchasing an arrow, give the dealer the bow weight and length of the archer's draw so that the proper arrow will be selected. An arrow with a spine too stiff for the bow will not bend correctly around the bow at release and will shoot to the left. If the spine is too flexible, the arrow will bend too much and shoot to the right. (This bending around the bow and recovery is called the Archer's Paradox.)



LENGTH

The length of the arrows will depend upon the archer's physical characteristics (see How to Measure Arrow Length). It is essential that arrows are long enough, as beginning archers have a tendency to overdraw, even when cautioned. Most children will take 24- to 26-inch arrows. A 26- to 28-inch length is usual for high-school students and adults. Several sets of extra-long (30- or 31-inch) arrows should be available for students who have a long reach.

MATERIAL

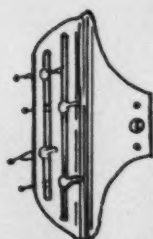
Fiberglass is an excellent material for arrows. Although they cost more than wood arrows, fiberglass arrows last longer, so they are less expensive in the long run. Wood is satisfactory for beginning classes if cost is a factor.

Aluminum, the most expensive material, has an advantage over fiberglass in that it is lighter and can be more closely matched. It is available in several different alloys, some of which are quite resistant to bending. They can also be straightened by someone with reasonable skill.

NUMBER

There should be a minimum of six arrows per student (with replacements available for arrows damaged during class). All arrows should be the proper length for the archer and spined for that archer's draw. All of the arrows for one student should be marked with the same crest or have some mark so that the student can identify them. Students should be assigned the same arrows each shooting session.

Accessories for Each Bow



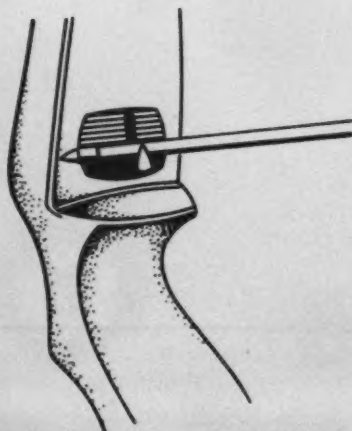
Bow sight

BOW SIGHT

Each bow may have a bow sight. This can be merely tape on the back of the bow that holds a dressmaker pin (pin with a large, colored head). A commercial hunting sight is excellent, as it has several pins on each sight. If students share the bow, each of them can then use a different pin on the same sight. If the two students sharing a bow are of markedly different arm length (draw), the multiple pin settings will be more satisfactory since there will be less likelihood of overlapping the other's settings.

BOWSTRING

Double-loop dacron bowstrings should be used on each bow and replacements should be available. The recommended length of the bowstring will be indicated on the bow (e.g., AMO 62" would mean a string marked 62 inches). Usually an 8- to 10-strand string works well with 20- to 25-pound bows.



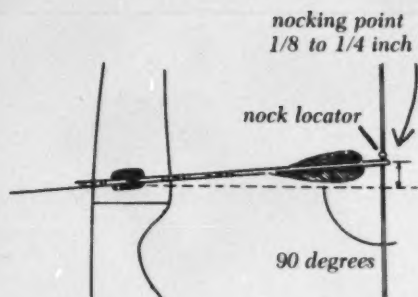
Arrow rest

ARROW REST

An arrow rest should be on the bow above the pivot point, approximately 1/2 inch above the arrow shelf.

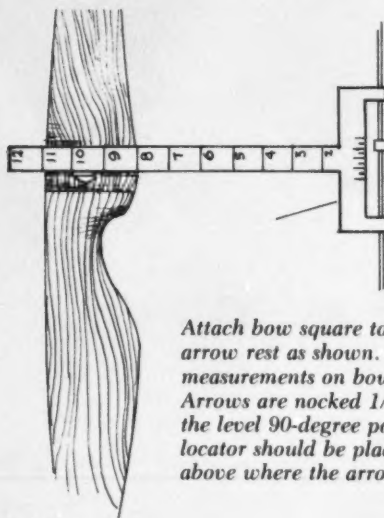
NOCK LOCATOR

A nock locator should be placed on the string (see drawing on next page). Imagine a line from the arrow rest on the bow to the string that is a 90-degree angle to the string. Above this spot measure a distance that is the diameter of the arrow plus 1/8 to 1/4 inch. Place the nock locator there. The arrow is nocked under the nock locator. This measurement places the arrow 1/8 to 1/4 inch above



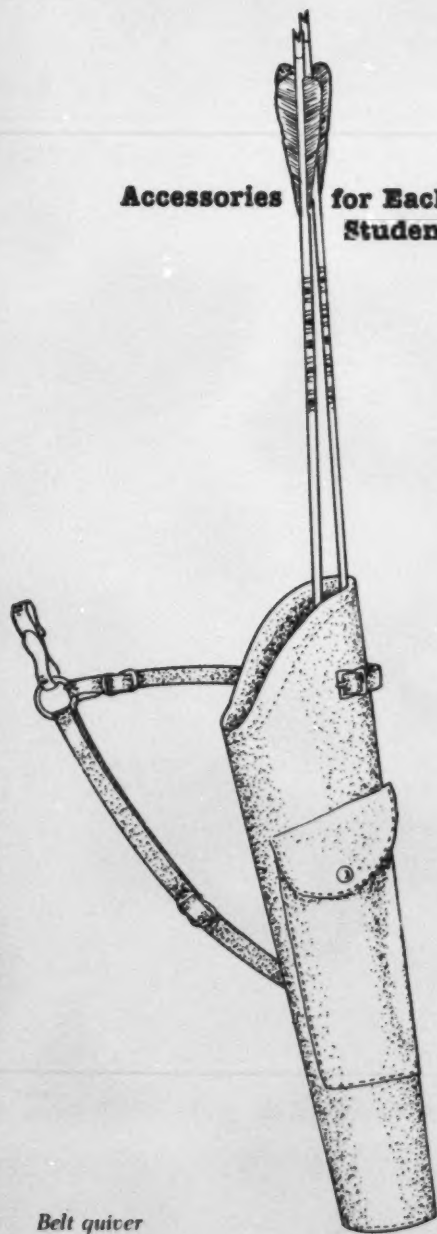
Finding proper placement for nock locator

90 degrees. A nock can also be located by using a bow square (see drawing below).



Attach bow square to string and place on arrow rest as shown. Refer to measurements on bow square cross bar. Arrows are nocked 1/8 to 1/4 inch above the level 90-degree position. The nock locator should be placed on the string just above where the arrow is nocked.

Accessories for Each Student

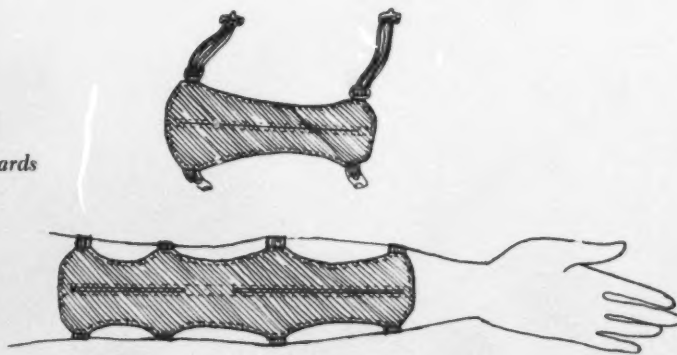


Belt quiver

ARM GUARD

Each student must have an arm guard available to use. A few longer arm guards (11- to 13-inch) should be available for students who have excessively hyper-extended elbows.

Arm guards



QUIVER

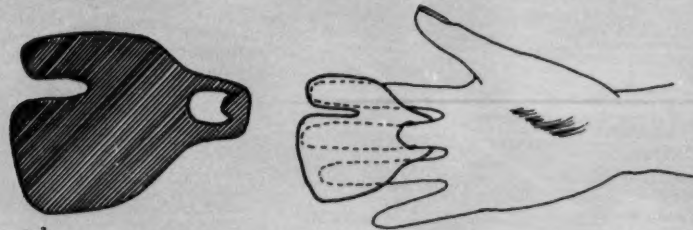
A simple leather quiver with a ring and an S-hook that can hang on the belt is the best type to assign students. Arrows are placed in this quiver.

If cost is a factor, empty tape cans obtained from a sports trainer can substitute as quivers. The can of arrows either can be set on the ground or holes can be driven through the upper wall of the tape can and an S-hook or strings inserted to attach the can to the belt.

Simple ground quivers also are suitable for outdoor class situations. These are metal and stick into the ground. Most ground quivers also will hold the bow when not in use.

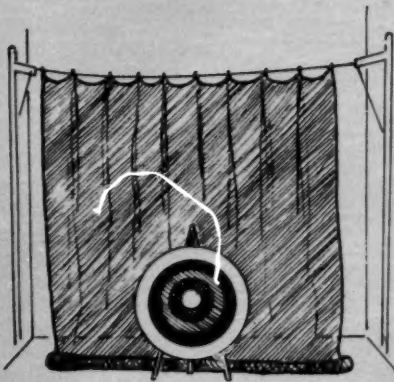
FINGER TAB

A finger tab must be used by each student. A variety of sizes should be available, including some for left-handed students. Reversible finger tabs work well because they can be used by both left- and right-handed archers. Gloves are not recommended for class situations where the gloves have to be shared.



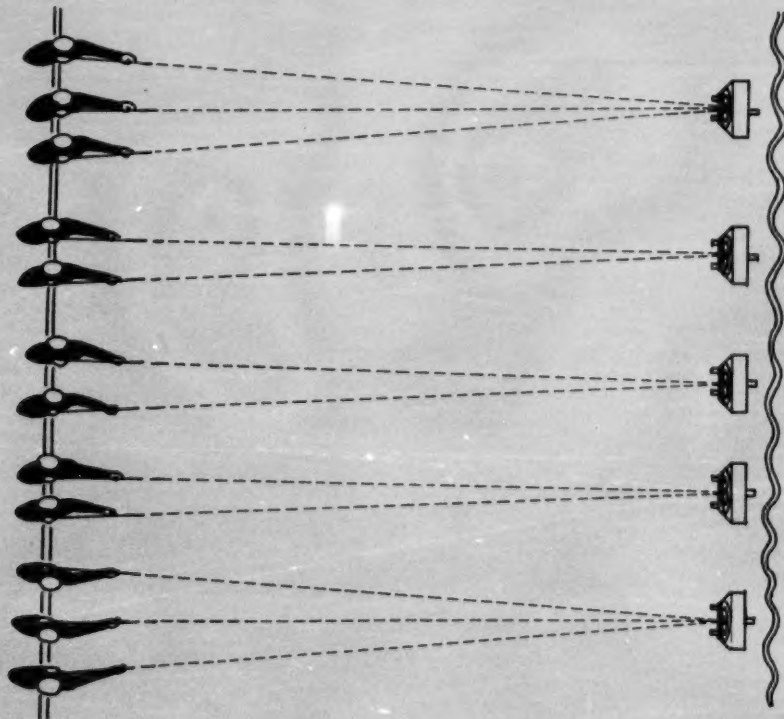
Finger tab

Range Layout



Backstop net

It is important that the area from the shooters to the target, at least 30 yards beyond, and to the side be so clear that no one could wander into the area without being seen. A backstop net is useful (both inside and outside) because it stops arrows that miss the target and reduces breakage. A dirt bank is fine as a backstop for outdoor shooting if it is high enough that arrows do not fly over the bank. Set up the range so the sun is not in the archer's eyes, preferably in a north and south direction. If there is any possibility of people entering the side of the range, erect fences to block their passage. Do not, however, depend on fences to guarantee safety; always be alert. Provide a safe area 20 to 30 yards beyond and to the side of the targets.



If shooting inside a building, never shoot toward an area that has a doorway. (This holds true even if the door is locked, since someone may have a key.) A backstop net is a necessity inside so that arrows are slowed down before they hit the wall. Allow for a 2-foot swing when hanging the net.

Shooting lines, made with chalk, tape, or string are necessary. A string 2 to 3 inches above the ground is successful with inexperienced classes who are shooting behind the line.

TARGET STAND

If targets cannot stand erect by themselves (e.g., bales), or if targets must be moved from place to place, a target stand should be available. A wooden tripod (with chains connecting the legs) makes a good stand. Metal braces are not recommended since arrows may hit the metal and be damaged. The target stand and target should be anchored so it will not fall forward and break any arrows that might be embedded in the target.

TARGETS

Material—A 36-inch target is large enough for most classes. It should be made of a durable material. Some foam targets are excellent, while others disintegrate quickly. When purchasing targets made of foam, investigate carefully. Targets made of woven grass are satisfactory and will last a long time. A 24-inch target may be added as a reinforcement behind the middle of the 36-inch target, if it has become worn with use. (This provides double thickness in the major hit area.)

Stacked cardboard (straw for indoor use or excelsior bales for outside) held together by metal straps is excellent in areas where the targets may be kept permanently. If installed outside, targets should be raised from the ground on wooden pallets.

Number—It is necessary to have a minimum of one target for every four students. Targets should be set up 1 to 2 yards apart.

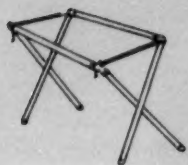
TARGET FACES

Commercial target faces should be purchased. They usually are made of paper or cardboard and are anchored to the target with target staples or shingle nails. Homemade target faces also can be used successfully. Check the lesson plans in this module to determine which target faces would best answer your needs.

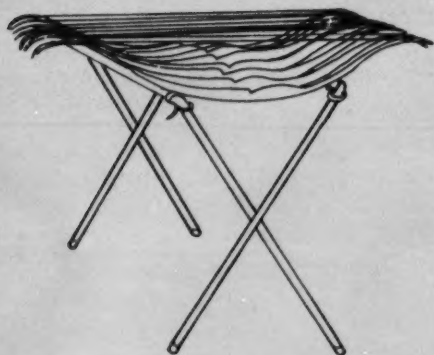
Equipment Storage

BOW RACK

A bow rack on which to place bows when they are not in use is essential unless ground quivers are used. The rack should have a platform approximately chest high on which



Bow rack

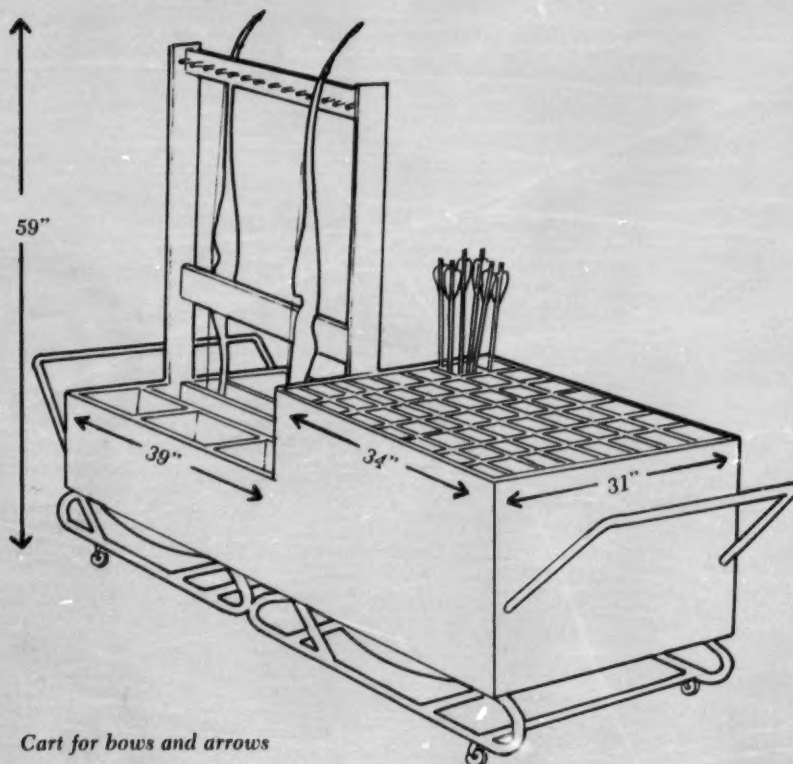


the bows rest. Bow racks of this type can be built inexpensively and are found on many ranges. (Industrial arts teachers might help with this project.)

BOW AND ARROW CART

This cart can contain storage for *all* necessary equipment. It is extremely handy, particularly in a flat area. However, it would not be as useful when equipment is stored on a different floor in a building with no elevator.

Arrows are numbered and stored in bins, numbered correspondingly. Quivers are stored in an area at the end of the arrow rack. Bows are hung from pegs and hang through the cut-out floor of the cart. Arm guards, finger tabs, and replacement supplies are stored in the side bins. Strings may be hung at the end of the bow rack and extra target faces stored, either flat or rolled, above the handles at both ends of the cart. (Industrial arts teachers also might help with this project.)



Cart for bows and arrows

Care of Equipment

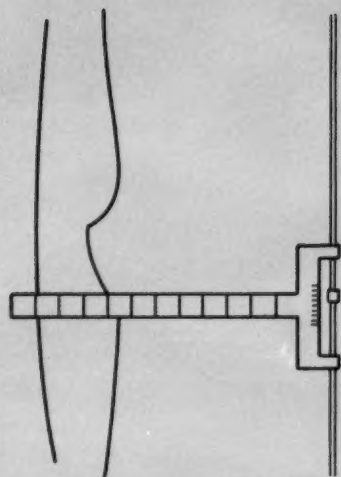
Students should become familiar with their equipment and check it before and after each shooting session for defects, wear, or other signs that it might be unsafe. If any defects are noted, students should immediately notify the instructor.

Improper equipment can be dangerous.

Arrows should be kept in the cart or quiver with their fletching receiving as little friction as possible. If the arrow has landed in dewy grass, wipe it off, stroking toward the nock end. A roughed-up fletching should be smoothed out by stroking toward the nock end. Do this before shooting the arrow again. Tassels made of yarn or soft rags work effectively for smoothing fletching.

Students should check their arrows after every end is shot. An arrow may have been hit or may have hit something, rendering it unshootable.

Bows should be kept on a cart or rack when not in the archers' hands. Never lay bows on the ground.



Finding string height with a bow square

STRING HEIGHT

At the beginning of each shooting period, students should use the bow square to check their bows. The bow square (in the shape of a T) indicates string height and nocking point. These measurements may have changed since the bow was last used, and the archer needs to start with the same measurements each shooting period.

To find the string height with the bow square, slip the top of the T, which has clips, over the bowstring. Slide along the string until the vertical part of the T is at the pivot point of the bow. Measurements (usually in inches) will be on the bow square at the pivot point. The distance between the string and the pivot point is the string height. The best string height is the distance recommended by the bow manufacturer.

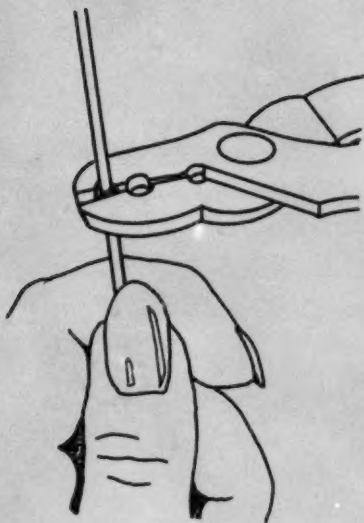
MINOR EQUIPMENT REPAIRS

Worn String—To replace a worn string, first remove the old string. Get a new string that is the recommended AMO length. One loop of the string will be larger than the other. Slip the larger loop over the upper end of the bow, past the limb notches. Then slip the small loop over the lower limb of the bow. This loop may be anchored later into the notch with a string holder of some type (a rubber band or short length of plastic tubing of a size that will go over the notches and protrude a little past the tip so the tip is protected). String the bow (see section on stringing). Put bow wax on the string and rub it in. Avoid getting wax on the serving.

Measure the actual string height (pivot point to string). If this disagrees with the bow manufacturer's recommended height, unstring the bow, then take the string off the upper end after first loosening the lower loop. Twist or untwist the string to shorten or lengthen it. This will increase or decrease the string height.

Place the string back on the bow. String the bow; remeasure. Repeat this procedure until the proper string height is reached. Remember that the string will stretch slightly. A few shots will settle it in.

Nock Locator—To place a nock locator on a string, or



Replacing a nock locator

to replace one, first measure with a bow square and find the proper location (usually so that the nock end of the arrow shaft is $1/8$ to $1/4$ inch above a line that is 90 degrees to the line of the string). Some nock locators are crimped on the string with a tool and some may be as simple as floss that is wound around the string. Be sure that the locator is secure, as movement up or down will result in poor arrow flight and inaccuracy.

Arrow Rest—To replace an arrow rest, buy a new one that has an adhesive backing. Remove old arrow rest. Peel off the protective sheet and place the arrow rest on the bow. It should be placed over the pivot point of the handle. The arrow rest should be approximately $1/2$ inch above the arrow shelf on the side where the arrow will be.

Nock—To replace a broken nock on cedar shafts, remove the old nock with a knife, stroking away from the body and toward the end of the nock. Get a nock that fits the arrow (some arrows that are stiffer in spine have a bigger diameter than those that are more flexible). Place a small drop of glue in the nock. Place the nock on the arrow, rotating it so that the glue is evenly distributed. Rotate the nock until the notch is at right angles to the cock feather. Be sure the nock is straight on the arrow. Wipe off any excess glue. For fiberglass arrows, aluminum inserts for nocks are available.

The *Archery Laboratory Manual* by Bavousett and Beardsley and Donovan's articles in *Archery World* magazine (Aug./Sept. 1976 through Oct./Nov. 1977) are excellent sources for further material on equipment repair.

Preliminaries in the Classroom

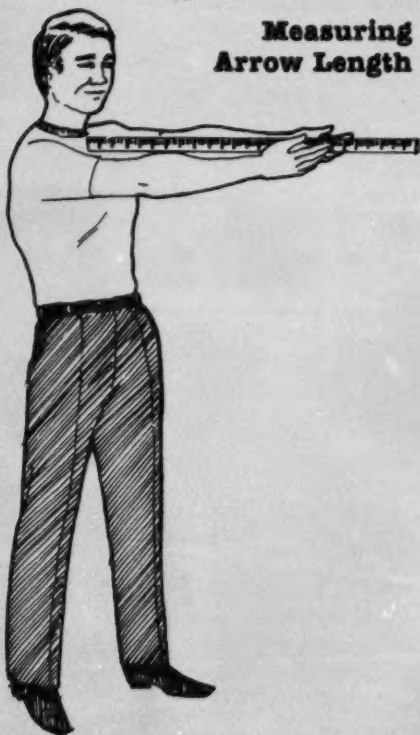
Finding the Dominant Eye



A student should shoot right-handed if the right eye is dominant and vice versa. This will increase the accuracy of the archer. However, as both sides of the body are used in drawing a bow, archery is not as awkward as some other sports for a definitely right-handed person who shoots left-handed.

To find which eye is dominant, have each student form a hole with two hands (as shown in drawing) and arms extended. Have each student face you, looking at you through the hole. Ask students to continue looking and bring their hands back to their faces. They will bring the opening in their hands to their dominant eye.

Measuring Arrow Length



Arrows assigned to an archer must be the proper length. The archer's arrow length (sometimes called draw length) may be measured by using a yardstick.

Place the one-inch end of the yardstick at the top of the archer's breastbone (just below the hollow of the neck). Arms should be stretched in front of the body, with palms flat against the yardstick. Tell the student to stretch, as it is imperative that arrows are long enough to allow for the tendency of beginners to overdraw. Be sure that the hands are even and that one does not project beyond the other. Assign to the student arrows that measure at least 1/2 inch beyond the point where the fingertips touch the yardstick.

After a student has attained some consistency in shooting, it may become evident that the arrows assigned are too long. Then it's time to reassign arrows that are nearer to the proper length. An arrow that is exactly the right length is 1/4 to 1/2 inch beyond the arrow rest, which is directly over the pivot point of the bow.

On the beginning level, however, a student can shoot satisfactorily with arrows that are too long. If in doubt, continue with the longer arrows because safety is more important at this stage of learning.

Preparing the Bow to Shoot



Unstrung bow



Strung bow

It is important that students learn to string and unstring their bows during a basic archery course. When the bowstring loops are properly placed in the notches at each end of the bow, the bow is ready for shooting.

STRINGING

There are several methods of stringing (bracing) the bow. The best method is to use a commercially-made bowstringer, following the manufacturer's directions. This is the safest method and will do the least damage to the bow. The push-pull method is extremely dangerous and should never be used. The step-through method is safer than the push-pull but can twist the limb of the bow.



Using a bowstringer

There are several styles of bowstringers. Most companies make the style that has a long string with a large pocket on one end. On the other end is a shallower pocket or loop. The student takes the bow in one hand and the stringer in the other.

One loop of the bowstring should be securely in the strung position on the unstrung bow. Place the deeper pocket of the bowstringer over this end.

Hold the bow by its handle with its back toward the archer and the strings of both the bowstringer and the bow on the side toward the ground. (Be sure that neither the bowstring nor the stringer is wrapped around the bow.)

The two main things to remember are: (1) Both strings go on the same side of the bow. (2) The shallow pocket or loop is placed on the end to be strung (the top limb).

The archer places a foot across the bowstringer to anchor it to the ground. While keeping the center of the bowstringer on the ground, the archer pulls up evenly on the bow handle. The stringer bends the bow enough to loosen the bowstring. This allows the archer's free hand to slip the bowstring into the notches of the upper limb. (Fingers should not come between the bowstring and bow.)

Check that the string is secured in both notches of the bow by feeling the notches. Remove the bowstringer. The bow now is strung and ready to shoot.

UNSTRINGING

Before the bow is stored, it should be unstrung. To unstring, merely reverse the process. The larger loop of the bowstring is slipped down out of the notches on the upper limb of the bow. (A laminated bow or a bow made entirely of fiberglass may be left strung for a few days without harm if it is stored correctly.)

Mimetics

Mimetics refers to mimicking the action of shooting an arrow with a bow, without some of the equipment. It is a helpful step in learning to shoot, particularly in a class situation. Most students cannot step up to the shooting line, nock an arrow, and shoot it without preliminary instruction. During this instruction, students are asked to imagine that a piece of equipment is being used or that, while one piece of equipment actually is being used, another is there also.

Beginning archers should progress slowly and carefully through these steps, getting the feel of each part of the total action before putting it all together. Then, when the first arrow is shot, students may shoot it safely and with some success.

Before starting the mimetics, students stand behind the instructor and watch an arrow shot. Discuss with them each step in the action clearly and slowly so they realize what part of the action of shooting they are doing when they do a specific mimetic.

Mimetics Without Equipment

Mimetics that can be done without equipment are stance, bow arm placement, draw, anchor, and release.

The *stance* can be checked quickly by the instructor. Make sure that the feet are in proper position and that archers have the correct side toward the target (see page 35 for instructions).

The *bow arm* can be checked by having a student who has the proper stance stick his or her bow arm out toward the target. Have the student imagine that a clock is on the target face. The thumb should be at 2 o'clock, the forefinger at 10 o'clock. The relaxed fingers should be toward 4 or 5 o'clock. The elbow should be turned toward 9 o'clock. (All of these placements are for right-handed archers who will use their left arm as the bow arm.) Emphasize that the shoulder of the bow arm stays in its natural position and is not hunched or pulled forward.

After the correct position of the bow arm has been practiced several times, students can learn the *draw to anchor*. The anchor is the spot that is contacted by the string and/or drawing hand when it is pulled back to the face. Each student should hold the bow arm in the correct position, pretending that the string hand is holding the string. Keeping their bow arms out, students then pull the *imaginary* string back to the anchor.

"Action should come from the upper arm and shoulder from the very beginning of the draw, with the fingers acting as hooks on an imaginary string. The forearm, wrist, and fist muscles should be relaxed." (Miller, 1968, p. 20.)

Students may feel the action of the *release* by placing



Feeling the action of release

the back of the bow hand up to the anchor position (to simulate the bowstring) with three fingers of the bow hand linked in reverse position with three fingers of the string hand (in anchor position). The shoulder blades are pulled together. The fingers are relaxed so they roll off gently in the line of pull. The reaction occurring as the hands separate is typical of the reaction in release.

Mimetics With Bow Only



Correct hand placement on center of bow handle

When students practice mimetics with the bow only, it may be a good idea to keep arrows out of reach, particularly if your students are young. Always demonstrate each step before students try it.

Students can learn to draw to anchor by taking the bow in the bow hand and raising the bow arm toward the target. The bow should be vertical.

Check the bow hand placement: thumb at approximately 2 o'clock, base of forefinger at approximately 10 o'clock. Fingers may be curled lightly around the bow, but bow must *not* be gripped tightly. There should be equal pressure on both sides of the V between the thumb and the forefinger. Check that the bow arm elbow is rotated to 9 o'clock so the elbow will not be hit.

The middle three fingers of the archer's string hand should be curled well around the string with the string in the first joint, (the nock locator between the forefinger and the middle finger), with the elbow of the string hand at the same elevation or slightly higher than the string hand. Fingers *leave* the string without pulling it, and the student brings the string hand to the anchor, imagining that the string is being pulled.

Before the next step on the draw anchor, demonstrate the draw and how to let down since the string should *not* be released at full draw.

Have students repeat the previous step, only this time actually pulling the string to full draw (anchor). Check string clearance at full draw. The elbow, shoulder, and chest should not interfere with the string. Do not allow students to hold the draw for a great length of time. Tell them to let down when they tire but to practice this step several times. (See "Anchor," page 37.)

Check all archers for string clearance before allowing them to proceed further.

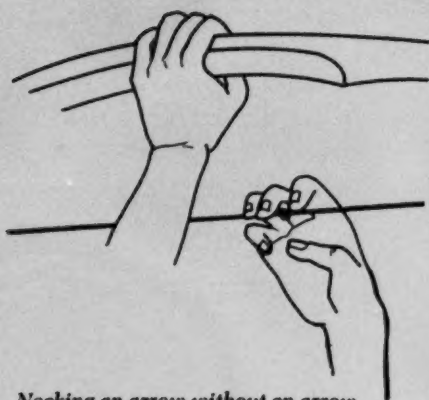
NOCKING ARROW WITHOUT AN ARROW

The instructor should demonstrate how an actual arrow is nocked, before students practice nocking without an arrow.

Have students hold their bows parallel to the ground with the string under the arm, so the bow forms a shelf. Then they should pretend to take an arrow from the quiver with the string hand and imagine nocking the arrow.

To imagine nocking the arrow and to get proper string-

Note to instructor: Students do not have arrows.



Nocking an arrow without an arrow



Proper string alignment

hand finger position, each student places the string fingers under the string with the palm up, so the middle three fingers are under the string at the first crease of the fingers. The nock locator (where the arrow eventually will be) should be between the forefinger and the middle finger. With the bodies erect, students should look at the target and raise their bow arms toward the target. Have students check bow arm, string arm, and hands as in past mimetics.

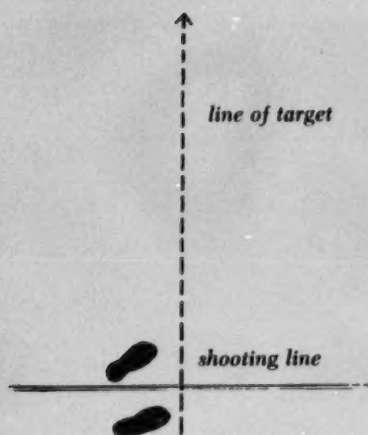
Students can feel the release of the string by going through the mimetics of nocking the arrow, placing the string hand on the string, and raising the bow toward the target. Have students pull their strings 4 to 5 inches or less with their string arms. The string hand relaxes gradually until the string is released. This step should be repeated several times. Check that students relax and don't pluck their strings.

PRACTICING STRING ALIGNMENT

All mimetics up to this point should be done before the first arrow is shot. After students shoot a few times, they should be taught string alignment.

Tell students to hold their bows toward the target. Have them move the string away from the forearm so they realize how no alignment looks. Then have them line the string up with the edge of the sight window (or the sight pin as shown). The string should be lined up with this area throughout the draw to full draw.

Learning to Shoot

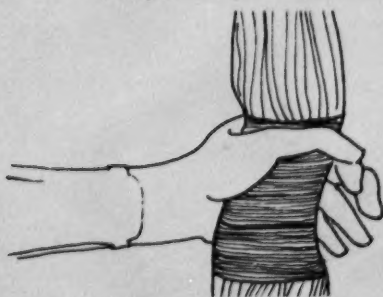


The instructor should discuss and demonstrate each step of shooting before taking the class through that step. The descriptions that follow are for right-handed archers; left-handed archers reverse. The instructor should use such terms as "bow hand" and "string hand" so that left- and right-handed archers have no difficulty understanding.

Demonstrate shooting with the students safely behind the line from which you shoot. Stand with feet parallel to the shooting line (if right-handed, the left side is toward the target; if left-handed, the right side). Feet should be about shoulder-width apart. Step back 1 to 2 inches with the target foot and turn the feet slightly toward the target. Weight should be evenly distributed on both feet. This is the open stance which is recommended.

One of the advantages of this stance is that the body is braced well, which is particularly important when the ground is irregular or the wind is blowing. Since this stance involves more muscles (back, upper arm, and shoulder), it is easier for the archer to pull the string to the proper anchor. The string also clears the bow arm much better than if the archer used a square stance, where the feet are parallel. (Later, archers may try the square stance and may find it to be successful.)

Bow Hand Position



Correct bow hand position with fingers relaxed and curled lightly around the bow.

Nocking Arrow and String Hand on String

Always have arrows point towards the target.

Have students pick up their bows with their left hands so the string side (face of bow) is toward them. Place the V between the thumb and forefinger directly behind the handle (pivot point) with only the thumb and forefinger around the handle. The forefinger and the thumb may be touching. The other fingers are relaxed and curled lightly around the bow. The pressure during the draw should be equal on both sides of the V. The wrist may be high or low, whichever seems natural to the student, but low is recommended because it is difficult for most archers to keep a high wrist for a long period of time.

Have students hold their bows parallel to the ground with the string under the arm. An arrow is then taken out of the quiver by the nock end (with the right hand) and laid on top of the bow, with the arrow pointing toward the target. The nock of the arrow is securely on the string, to the left of the nock indicator, with the index or cock feather (odd-colored feather) up. The shaft will be next to the arrow rest on its left (with the bow in this position).

The string hand (right hand away from the target) should be placed under the string, palm up, so that the middle three fingers are hooked well around the string with the string in the first crease of the fingers. The arrow nock

should be between the forefinger and middle finger, with no pressure on it by the fingers. The fingers will keep this position with the thumb and the little finger relaxed in the palm and away from the arrow nock and string throughout the draw.

A common error is to hyper-extend the string-hand wrist. This causes problems later in draw and release. Emphasize that the string hand is relaxed and that the wrist is not higher than the hand when the arrow is nocked.

Bow Arm and Draw

Editor's Note: The author describes one placement of the bow arm which she has found successful with beginners. Some archers feel the bow arm has forward pressure during the draw and the shoulder is not "seated," but under controlled tension.



Good bow arm

The body should be in an erect position with eyes focusing on the target. The bow is parallel to the ground. The bow hand is relaxed and in the correct position.

Have students raise their bows toward the target until their bow arms are pointed toward the lower half of the target, with bows vertical. The shoulder of the bow arms should be "seated" (with a slight pull of the string). Seating is the action of placing the bone of the upper arm into the shallow shoulder pocket. Since the shoulder joint is shallow, the upper arm bone may "float" forward out of this area when more pressure is placed on it when the bow is pulled to full draw. Seating the shoulder prevents it from "floating" forward on the draw.

You should emphasize that the bow arm is a straight rod against which the archer pulls. If the bow arm is set correctly, it will take less work to keep it in the proper position, and there is less danger of the bow arm being hit on release. The elbow of the bow arm will not be hit by the string in this "rod" position if the bow hand is correctly set and the shoulder is not allowed to float forward.

The elbow of the bow arm (if right-handed) should be "pointed to the wall" (side of range) or 9 o'clock. The elbow of the string hand should be even with or 1 inch higher than the string hand.

Pull the string to a good solid anchor, rotating the upper part of the body slightly away from the target. The shoulder blades should feel as if they are squeezing together. Check that no part of the body is between the string and the bow at full draw.

A student whose bow-arm elbow naturally hyper-extends should be coached to slightly flex the elbow in the 9 o'clock position. A longer arm guard also should be given to this student.

The arrow may leave the arrow rest. If this occurs, caution students to immediately let down and start again. The arrow's leaving the arrow rest during the draw can be caused by pulling the string with the hand muscles rather than with the upper arm, shoulder, and back muscles, or pinching the arrow.

One precaution that prevents many problems during a draw can be taken when the arrow is nocked and the

bow is parallel to the ground. Look for an incorrect string hand: the wrist will be hyper-extended or the hand will be cupped. The archer who draws with an incorrect string hand must pull with the hand. Emphasize that at the time the arrow is nocked and throughout the draw, the wrist and hand are completely relaxed, with only the muscles that are keeping the fingers hooked around the string in use. The pull is from the tip of the elbow. If, on the draw, you detect that an archer's string hand is cupped or that the knuckles are paler than the rest of the hand, have the student let down and start again with a relaxed string hand.

If the string-arm elbow is too high or if the fingers are too close to the arrow, the arrow can be pinched, causing it to leave the rest. Students should try to keep an equal pull on the string with all three fingers. Students who do this probably will not pinch the arrow.

Another possible cause of an arrow's leaving the rest is the archer's attempt to pull the string away from the bow arm on the draw. The archer is usually pulling with forearm alone in this situation. Emphasize pulling from the tip of the elbow and keeping the string aligned behind the bow.

Anchor

Either the high or low anchor is acceptable. The lessons in the module teach both and students may select the one they find the most comfortable, or the instructor may select one and use it throughout the lessons.

In all anchors, an archer turns the head and looks directly at the target. The head should always be held this way, as a tilt or movement of the head to the string hand will change the alignment.

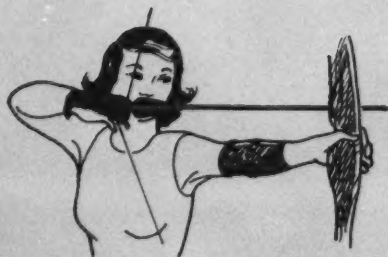
When teaching the anchor, certain steps need to be followed for the sake of safety. A bow should never be pulled to complete draw and the string allowed to leave the string hand without the weight of an arrow on the string. To do so will damage the bow. The anchor, however, should not be introduced to a first-time archer using an arrow because it is too risky. Therefore, the anchor should be taught in stages (see chapter on mimetics).

Without the bowstring, have students place the string hand on the proper place on the face. Then students will bring the bowstring to the proper anchor and let down. The bow arm will relax slowly at the same time the string hand goes forward holding onto the string, so that the bow slowly returns to the original position. After students have mastered these steps, they can anchor and release with the arrow.

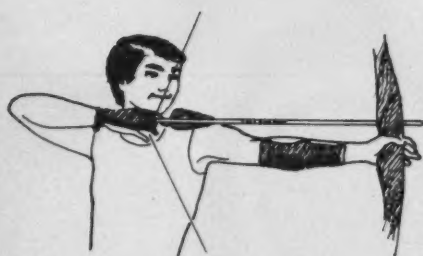
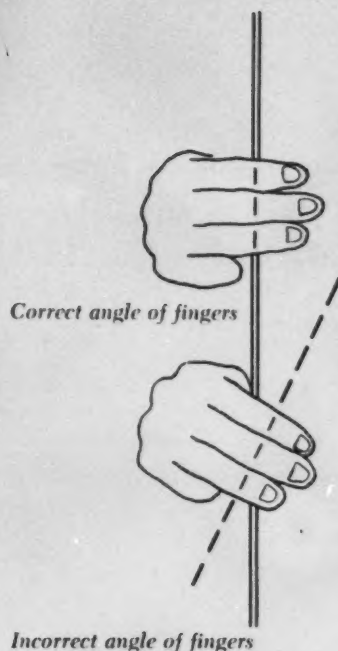
HIGH ANCHOR

High anchor gets its name from the fact that the hand pulling the string comes to a high spot on the face. Students

Two reference points are needed for an anchor.



High anchor



Low anchor

should hold the string hand so that the end of the forefinger holding the string lies under the cheekbone, with the end of this forefinger touching the corner of the mouth. The thumb is relaxed and should curl under the jaw so the angle between the thumb and the forefinger is around the jaw under the ear. The other two middle fingers are also on the string and are close to the side of the jaw. The forefinger lies back from the corner of the mouth directly under the ear. The elbow is back; the shoulder blades are pulled together. The palm is toward the face.

One common error in the high anchor is that the hand is not flat against the face, so the palm of the hand is toward the floor. This twists the string on release. Another possible problem with the high anchor is that the corner of the mouth can move; therefore, the anchor may vary. (A beginning archer might want to touch a tooth with the forefinger to have a solid spot.) Also, if the archer's head turns to the right at anchor, the nose may be hit on the release.

LOW ANCHOR

In low anchor, the top of the forefinger lies under the jaw. This places all three fingers on the string under the chin and jaw. The string itself touches the center of the chin. The forearm should go back from the hand so that the elbow is even with or a little above the height of the string hand.

One possible error with the low anchor is that an archer's forefinger may not be snug under the jaw. If daylight can be seen between the jaw and the forefinger, the arrow will go high. Not touching the center of the chin with the string on the low anchor will cause loss of power and a bad arrow.

With either anchor, opening or closing the mouth, chewing gum, or other movement can change the anchor. You should emphasize that students need to have at least two reference points for the anchor and these points must always be touched on each arrow. The head may be tipped forward so the nose touches the string, which gives a third reference point. Whichever anchor is used (even an anchor between the high and low), the archer must repeat it exactly, time after time, for consistent results.

Aiming

INSTINCTIVE AIMING

It is important that the instructor understand instinctive aiming because the first arrows are shot without a sight in this module. Since beginning archers should be placed at a distance fairly close to the target, it is only necessary to tell them to raise the bow arm if the arrow goes low, or to lower the bow arm if the arrow goes high. In other words, to adjust for high or low grouping in bare bow aiming, move the arrow point in the direction you

wish the arrows to go.

As students practice this, and as they perfect the rest of their form so that a consistency occurs, some will realize that the arrow is seen below the center of the target they hit. They may ask why. Explain that although the arrow is pointing directly at the target, their line of sight extends to the ground, because the eye is above the anchor.



Archer's sight picture using a sight

Move the sight in the direction of the error.

The anchor must be checked as carefully as the sight. Consistency leads to accuracy.

AIMING WITH A BOW SIGHT

You may use a sight with the first arrow, but students seem to have better form if they are not confused with a sight on the first few arrows. Use of a sight should be taught after students have shot a few arrows safely and have used a good anchor. If more than one student uses a particular bow, using a sight with a pin for each student is more successful than using a single pin. This way the sights do not have to be continually readjusted.

To set the sight pin for 4 meters, using a high anchor, the instructor or student should set the pin at an arbitrary starting point approximately 3 inches (for young children) to 5 inches (for tall men) above the arrow rest. The sight should be set so that its tip is directly over the shaft of the arrow. Students should hold their bow arm out with the bow in shooting position. The string hand is not used. With their non-dominant eye closed, students should check string alignment and set the sight pin in the target center. Then have them draw to anchor and, at full draw, check the string alignment and sight.

Students then should shoot a minimum of two arrows with the same sight setting and the same form. If the arrows group high, the sight should be raised, and vice versa. Emphasize that the sight corresponds to the center of the target, not to the point of the arrow, because students may think it is not logical to move the sight in the direction of the error. Students should change their sights until eventually a group of arrows can be shot in the center of the target at this distance. When they move back further from the target, the pin should be moved down.

The goal of archery is to have a group of arrows in the center of the target. The first step to achieving this is to get a group of arrows at the same spot anywhere on the target. Then the sight can be changed or one habit changed so that the arrows will hit in the center.

In order to have a consistent group, two things are basic at full draw: the tip of the arrow should be at the same spot as in past arrows (this is checked by the sight) and the nock of the arrow should be at the same spot as in past arrows (this is checked by the anchor). Many beginning archers worry about the sight and bow arm and move all over their face on the anchor for different arrows. They can't understand why they don't get a consistent group. For beginning success, the anchor must be checked as carefully as the sight.

Release and Follow-through

A good follow-through is merely the result of the actions preceding it. The follow-through will be a smooth reaction backward in the line of pull and in the proper position if an archer concentrates on the center of the target; has a solid bow arm, a relaxed bow hand in the proper position, and good back tension; aligns the forearm of the string arm on a plane with the arrow; and relaxes the back of the string hand on release.

A solid bow arm means that the bow arm is a straight line, with the bow hand properly set and relaxed, against which an archer pulls. If the bow arm is set correctly, it will take less work to keep it in this position. The bow also will work more effectively. An archer should try to keep back tension and the bow arm in this position after the release until the arrow strikes the target.

The string-hand forearm and elbow should be as high as the string hand, in order for the back muscles to come into play. If the elbow is dropped, the pull is mainly with the forearm muscles and the archer will tire and the action will be inefficient. No one works harder than an archer attempting to pull the string back with just the forearm muscles. The action not only causes poor arrow flight, but the student quickly gets exhausted and discouraged.

The instructor can get the proper action by explaining, "the elbow of the string hand should pull the string and the arm back." This action uses the upper arm, shoulder, and back muscles.

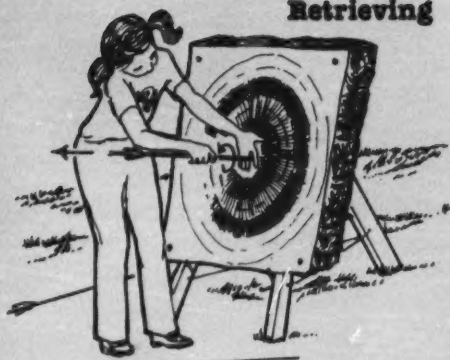
The most difficult part of the release for most students is the relaxation of the hand on the release. The proper action should be taught on the first arrow released, with re-emphasis on the following arrows, so students rarely experience an improper release. It is difficult to change an improper release after a student has developed the habit of releasing incorrectly.

Describe the action as a relaxation not a release, as the latter term seems to cause a pluck. Students should relax the muscles in the forearm and the back of the hand until the string takes the arrow forward. An archer experiencing a proper release literally does not know when the string will take the arrow. The instructor sometimes can help a student having difficulty getting a relaxed release by tapping the back of the student's hand before the release. This seems to isolate the proper muscles that should relax.

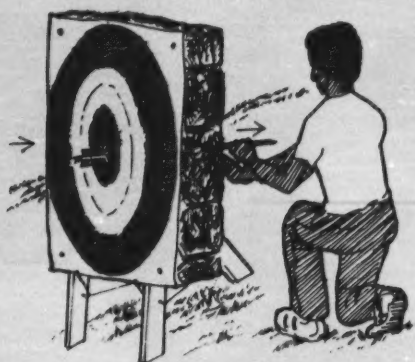
Constant back tension takes a lot of practice and is difficult to check. Watch students during the follow-through and check to see if their string hand goes back in the line of pull after release. If the hand goes forward or creeps away from the face, there is probably a loss of back tension. Check to see if your students are keeping constant back tension by visually lining up the string-hand elbow with some spot behind each one of them. If the elbow goes back and hides this spot on release, the back probably is being used. You also can place your hand an inch behind

archer's string-arm elbow. If your hand is hit by the archer's elbow on the follow-through, then the student probably has back tension. If the tip of the arrow is going forward just preceding and during release (creeping), there is a lack of back tension.

Retrieving



Pulling arrow from target



Pulling arrow through target

After the designated number of arrows have been shot, students should step back from the line and place their bows on the rack. Archers must wait for the signal (two whistles or the word "retrieve") to move across the shooting line. They should be told to walk toward the target, looking at the ground for any arrows that fell short. These arrows should be picked up. If the area is grassy and an arrow is in the grass, demonstrate how the arrow is to be picked up. Pick it up by pulling in the direction of the point so the grass does not tear the fletching. Fragile feathers can be ruined by pulling the arrow backward through the grass.

Demonstrate how to retrieve arrows from the target before letting students pull any out. All archers, with the exception of the one pulling the arrows from the target, should stand to the side of the target and across from the person removing the arrows. The archer pulling the arrows places the back of one hand against the target face with fingers close to the shaft of the arrow. The other hand grips the shaft close to the hand on the target. Using an unscrewing motion, the archer pulls the arrow from the target. If the fletching has entered the target, the arrow should be pulled forward and through the target.

After removing their arrows, students should place the arrows in the quivers and return to the shooting line with the instructor.

Achieving Success

After safety, the top priority for a basic archery course is a reasonable degree of success for the students. Some of the most common errors occurring in the first few lessons are described here.

LEFT ARROW

An arrow that goes to the left can be caused by a hunched or floating bow-arm shoulder (maximally elevated shoulder girdle), poor string alignment (too far to the right on the bow), a floating anchor (away from the face), or the archer's plucking away from the face on release. Emphasize a solid anchor, proper bow arm, back tension, and a relaxed release.

If a right-handed beginner's arrows go extremely to the left, and a sight is being used, check to see whether the right eye is closed instead of the left.

RIGHT ARROW

If a beginner's arrows go to the right, first check the release, as a plucked release is a common cause. Also check to see whether the student has a consistent string alignment along the edge of the sight window or shaft of the arrow.

LOW ARROW

If the arrows are low, the beginner is probably creeping, which is caused by a lack of back tension. It also may be that the nock locator has slipped up or the student has moved the sight pin up on the last low arrow.

HIGH ARROW

If the arrows go high, it may be a pluck or a mechanical problem, as in the low arrow.

Scoring and Rounds

Editor's Note: The National Archery Association and the National Field Archery Association have authorized the use of their rules on scoring and rounds in this module. The rules are necessarily abbreviated. More complete material may be obtained from the organizations themselves. (Their addresses are given at the end of this module.) Missouri archers should know about both organizations.

There are many regulation rounds in both the National Archery Association and the National Field Archery Association. These rounds are for different situations (indoor or outdoor), distances, and skills. All of them are used each year throughout the United States.

In order to simplify things, the author has given only the rules that apply to the three rounds in this section and to the modified rounds developed in the lesson. The author also has attempted to contrast a target round, a field round, and an animal round. Purists may object that this does not present the complete picture, and the author agrees, but a maximum of 10 lessons gives only enough time for a short orientation.

Scoring

Given here are some simple, but correct, rules for scoring target and field rounds. It is important that an archery instructor use correct rules, even if only a few are used.

The numbering used in the quoted material duplicates the numbers used in the constitutions of the two national archery organizations.

H. FIELD ARCHERY

Following are National Field Archery Association rules that may be used on an indoor range (under 25 meters). Outdoor rules are described under Field Range. Regulation field rounds involve many more rules.

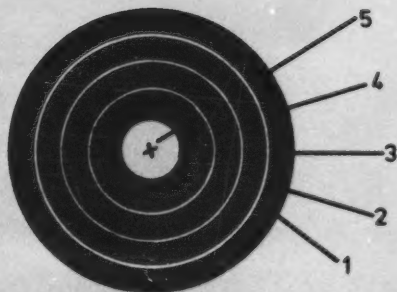
Scoring

"2. Targets:

- a) The target face...shall be of dull blue color. The spot shall be two white rings with blue X in center ring. All inscribed scoring rings shall be white. (X-ring is used for tie breakers only).

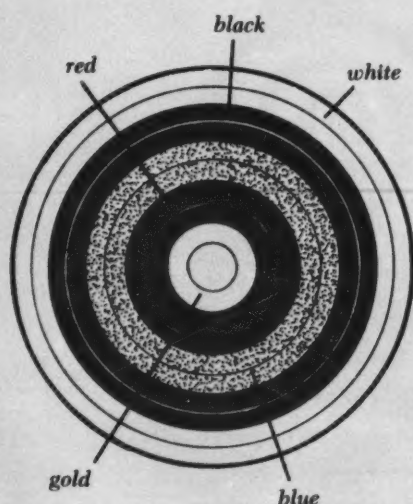
"5. Scoring:

- a) The scoring is 5, 4, 3, 2, 1 from the spot out.
- b) All arrows will be scored and recorded before touching or drawing any arrows from the target.
- c) An arrow cutting two rings shall be scored in the ring of greater value. Scoring is determined by the position of the shaft. The shaft must cut through the line and touch the area of higher value in order to



Indoor field archery target face

Note: An instructor may be unable to get FITA faces. If you can get undivided colored faces (same colors as the FITA), use these. The scoring is 9-7-5-3-1 from the inside out or from the gold to the white.



Target archery face

be scored as the higher value.

- d) Witnessed bounce-outs or arrows passing completely through the target will be re-shot.
- e) Hits on the wrong target will be scored as misses.
- f) When an arrow is dropped while the archer is in the act of shooting, he may shoot another arrow in place of the dropped arrow if the dropped arrow is within 10 feet of the shooting lines.
- g) If an archer shoots more than 5 arrows in an end, only the five arrows of lower value may be scored.
- h) If an archer shoots less than 5 arrows in one end he may shoot his remaining arrows if the omission is discovered before the end is officially completed; otherwise they shall be scored as misses."

(Constitution and By-Laws of the National Field Archery Association, February 1980, pp. 48-49.)

TARGET ARCHERY

National Archery Association rules are used not only for target archery competition in the United States but for all types of international competition (FITA), including field archery and the Olympics. The Constitution and Rule of the International Archery Federation (1979, pp. 52-58) states:

"700 The FITA Round....

"702 (e)	...Scoring Values	Colours
	Zone Inner 10	Gold/Yellow
	Outer 9	
	Inner 8	Red
	Outer 7	
	Inner 6	Light Blue
	Outer 5	
	Inner 4	Black
	Outer 3	
	Inner 2	White
	Outer 1	

"705 (a) Each archer shall shoot his arrows in ends of three arrows each....

"706 (a) One scorer shall be appointed for each target.

(b) ...scoring may take place after each end of three arrows or after every second end (six arrows)....

(c) Scorers shall enter in descending order the value of each arrow on score sheets....

(d) Neither the arrows nor the face shall be touched until all the arrows on that target have been recorded.

(e) An arrow shall be scored according to the position of the shaft in the target face....

(g) Should the shaft of an arrow touch two colors, or touch any dividing line between scoring zones, that arrow shall score the higher value of the zones affected....

- (h) Unless all arrow holes are suitably marked on each occasion when arrows are scored and drawn from the target, arrows rebounding from the target face shall not be scored.
- (i) An arrow hitting and rebounding shall score according to its impact on the target....”

Bounds

Three rounds are given in this module. If a class progresses rapidly and the instructor wishes to go beyond the lessons in this module, these rounds may be used.

INDOOR FITA ROUND

The National Archery Association Instructor's Manual (Baier, 1976, p. 112) contains the following information on the indoor FITA (Federation Internationale de tir à l'Arc) round:

Target: 5 colors

Score: 10-1

Distance	Arrows	Arrows per end	Ends per Distance	Total Ends	Size Target	Possible Points
18 m	30	3	10	10	40 cm	300
25 m	30	3	10	10	60 cm	300

*Score card reprinted by permission of the
National Archery Association*

[illegible]

Animal target

ANIMAL ROUND

According to the National Field Archery Association (1980, pp. 41-42, p. 35):

"2. Targets

- a) The targets for this round are animal targets with the scoring area divided into two parts. The high scoring area is oblong while the low scoring area is the area between the high scoring area and the 'hide and hair' line or 'feathers,' as the case may be. The area between the 'hide and hair' line (including the line) to the outside of the carcass is considered a non-scoring area....

"4. Shooting Rules

A maximum of three marked arrows may be shot, in

successive order, and the highest scoring arrow will count...

"5. Scoring

- a) 20 or 16 for the first arrow
14 or 10 for the second arrow
8 or 4 for the third arrow
- b) The arrow shaft must cut through the line to score. If an arrow shaft touches the outside edge of an animal target it does not score. If it hits the target and cuts into, but not through, the 'hair and hide' line, it does not score. It must cut through this line to score a shot of lower value. To score, an arrow shaft must cut through this line."

The targets may be used on the range suggested in this module and at the distances recommended, or on a regulation field course, or on a modified field course developed by the instructor.

20 YARD FLINT ROUND

For this round, the NFAA (1980, p. 51) states:

"6. 20 Yard Flint Round

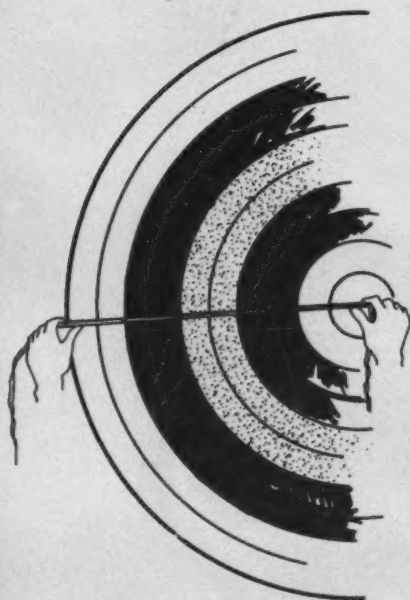
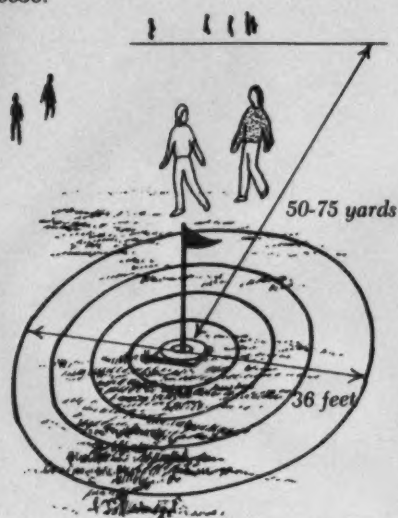
- a) Because of the inability of many clubs to obtain the necessary space for a 30 yard indoor round, the NFAA has provided rules for a 20 yard round as follows:

Target Number	Distance	Number of Arrows	Target Size
1	50 ft.	4	35 cm
2	20 ft.	4	20 cm
3	60 ft.	4	35 cm
4	45 ft.	4	20 cm
5	40 ft.	4	35 cm
6	30 ft.	4	20 cm
7	60, 50, 40, 30 ft.	1 each	35 cm"

Novelty Events

Clout

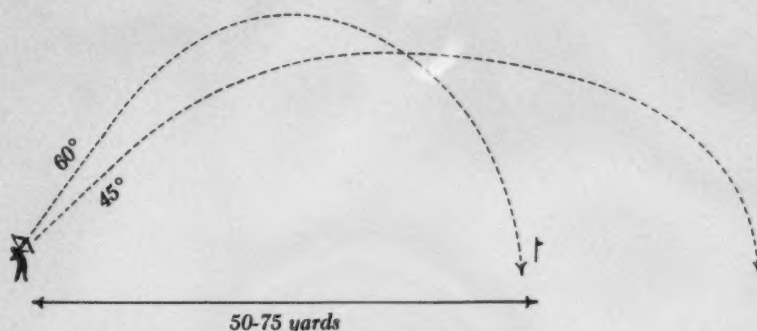
Editor's Note: There are several sources for description of novelty events, but specific rules quoted in this module are reprinted by permission of the National Archery Association, 1951 Geraldson Drive, Lancaster, PA 17601, and the American Alliance for Health, Physical Education, Recreation and Dance, 1201 Sixteenth Street, NW, Washington, D.C. 20036.



Measure radius of target in inches, marking bands of color on string. To make a clout line, transfer the colors from the string to a plastic line using feet instead of inches.

Clout is an event that historically had its basis in warfare. The object in clout is to shoot into a target area on the ground that measures in feet what the regulation target measures in inches. A flag denotes the center of the target and archers shoot as close to it as possible.

An open area at least the size of a football field is needed for this round. The instructor should pace off from the shooting line a distance that can be reached comfortably by the beginning archer and place a flag there. For adults using a 25-pound bow, a good distance is 60 to 70 yards. It is better to be too far away and shorten the distance if necessary. Being too close increases the danger of shooting at too sharp an angle.



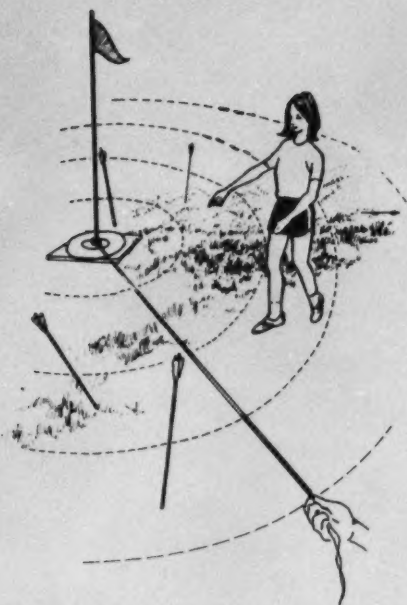
To make a clout line for scoring, first measure in inches, with a string, the bands of color on the radius of the regular target face students have been using. Mark the colors on the string. Transfer the string colors to a plastic line that will take color from a marking pen, changing inches on the string to feet on the plastic line.

The archer will need six arrows for this event. The arrows should be safe to shoot but not expensive since shooting them into the ground may cause some damage. It is not advisable that this activity be done on rocky ground.

Archers should realize that the greatest distance will be a 45-degree angle of the arrow. Caution them to come to anchor before raising the bow. Archers who are tilted back seem to lose awareness of the body; therefore, they may overdraw.

A sight indicating 45 degrees (anything that will stay on with a rubber band will do) can be placed on the lower limb of the bow by the instructor. The sight can be lined up with the flag marking the center of the target.

To teach this activity, divide students so each has a partner. Have the student who will shoot first go through the proper steps without the arrow: come to anchor, raise the bow, place the sight on the flag, let down. Have the



Station a student in each of the five scoring areas close to the scoring line.

partner help check to see that there is approximately a 45-degree angle of arrow. The partner also checks the string clearance, as beginning archers often seem to forget this. Students then shoot two arrows, with their partners helping spot where the arrows go in relation to the flag.

Students have a tendency to overdraw or to jerk on release, thinking the distance is quite far. Emphasize that they must have proper release or the arrow will be erratic. At this point, students should adjust their sights if necessary. If over-shooting, as most of them should be doing if the distance is comfortable, move the sight lower on the limb. This will increase the size of the angle and the archer's arrow will go higher but a shorter distance, and therefore closer to the flag. Students then should shoot the rest of their arrows.

To score the clout, place the gold part of the clout line at the flag. One student holds one end of the clout line at the flag while another student takes the other end. Place one student beside the line at each color (e.g., one student for gold, one for red, etc.) The student holding the outer end of the line will walk a complete circle. Students at each color follow the clout line on its circuit, picking up any arrows whose points touch in their color. Misses are picked up by the rest of the class after the clout line has passed.

After a complete circuit, the line is stretched on the ground. Students responsible for the colors of the target area lay the arrows they have picked up on the corresponding colored section of the clout line. Shooters determine their own scores by picking up their arrows, starting at the flag, and calling out the score for each: 9, 7, 5, 3, and 1 from the center out. (Baier, 1976, pp. 41 and 115.)

Archery Golf

Archery golf is an enjoyable novelty event that seems to bring together all aspects of archery: distance shots, close shots, accuracy, courtesy, and fun. In some areas of the country, it is done on an actual golf course. For purposes of a beginning archery course, the game can be played without that advantage.

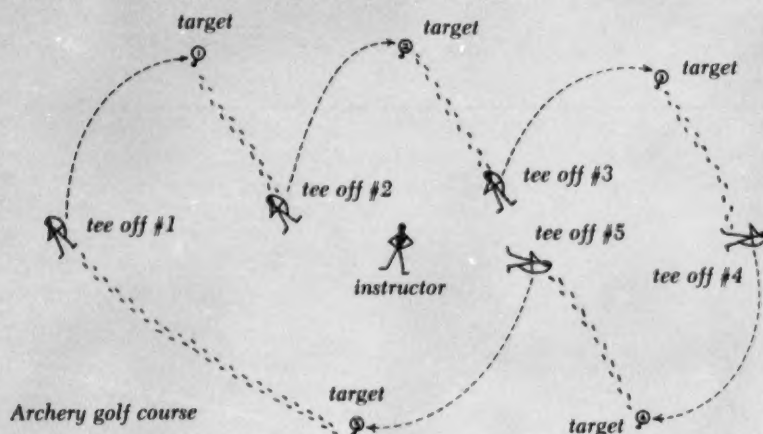
The targets can be small balls elevated from the ground or actual targets that will rotate. Targets that are not the regulation type but are easily seen (since the territory is quite large for safety reasons), work best and are the safest. Any kind of stake 1 to 2 feet high with a brightly-colored target that will not be blown off will do. For example, ground quivers (metal stakes for bow and arrows) with bright orange plastic children's halloween pumpkins inverted over them can be used. Two brightly colored cones (perhaps orange) are used for each tee-off spot. Therefore, when explaining the game, the instructor merely points out the double orange spots (tee-off) and single orange spots (targets) to show the layout of the



Archery golf target

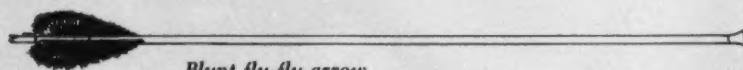
course.

When laying out the course, be sure that the next target's tee-off area is at a safe distance and at right angles to the previous area's target. The course should be laid out in a clockwise direction. Assume the greatest error and angle of tangency (20 yards at least). Also, the course should be laid out with a safe area in the center and 20-30 yards around the periphery. From this area, you can observe all of your students at all times.



Archery golf course

Blunt flu-flu work best for this game. Since these arrows do not go far, the course can be set up in a smaller area. Also, blunt tips prevent the arrows' being lost in the grass. Since some of these games are set up on athletic fields, all arrows must be recovered for the safety of those using the field afterward.



Blunt flu-flu arrow

To teach archery golf, give out the equipment (one 30-inch blunt-tipped flu-flu per student) and show students the layout of the course. Emphasize that the instructor will be in the center of this layout with a whistle. Anyone who hears the whistle is to stop shooting and look toward the instructor for further directions.

Divide the class into groups of approximately equal ability and number (no more than four per group), so that no one group goes too quickly and has to wait on the group ahead of it.

1. The archer tees off behind an imaginary line between the cones. Caution the students not to overdraw or jerk on the release, as this is quite dangerous. Emphasize that a 45-degree angle will get the best distance. Stress the proper shooting technique.
2. Each succeeding shot is taken in this manner: the archer places the forward foot where the arrow landed, picks up the arrow and shoots it again. The archer continues shooting, in turn, until he or she eventually hits the target.

3. The archer farthest from the target shoots first, as in golf. All other archers stay behind the shooter.
4. On short shots, all other archers stay far enough back that they are not hit by a deflected arrow.
5. The score on each target is the number of shots it has taken an archer to hit the target.
6. After all the students in a group have hit a particular target, they go immediately to the next tee-off spot. They do not tee off until the preceding group have finished and are on the next tee.

The National Archery Association lists the following golf rules that should be observed:

- "1. The person with the lowest score on the previous hole tees off first.
- "2. If an arrow lands in an unplayable position, the next shot may be taken from the nearest open spot, but no nearer the target. One penalty point is added to the score.
- "3. If an arrow is lost and cannot be found within 5 minutes, a substitute arrow may be shot from a spot agreed upon by the group and within the 'lost' area, with one penalty point added to the score.
- "4. If an arrow goes out-of-bounds, another shot shall be taken from the same position, with both shots counted and a penalty point added." (Baier, 1976, p. 118.)

Shooting at Balloons

Archers, particularly young children, like the sound and action of breaking a balloon with an arrow. A balloon can be drawn on a piece of cardboard. The cardboard is placed on a target with a real, blown-up balloon placed over the drawn balloon. This game is just for fun with no scoring needed.

Balloons also can be used for an archery bowling game. Draw a diagram of bowling pins on a piece of cardboard and tie a balloon over each of the 10 pins. Fasten this to a target. The archer who breaks the balloon over pin No. 3 gets 3 points or over pin No. 10, 10 points, etc.

Other games can be created with balloons, but care should be taken not to use figures of people or anything else that should not be used as targets.

TIC-TAC-TOE

The idea for archery tic-tac-toe is used by permission of the American Association for Health, Physical Education, Recreation and Dance. Two targets (one for each team) are used. On each target, arrange nine balloons in three rows to correspond to the spaces of a regular tic-tac-toe game. The first team to break the balloons in a line (horizontal, vertical, or diagonal), completing a tic-tac-toe, wins.

In all of the balloon games, only one arrow is shot by each archer, and only one archer on each team shoots at a time. Usually, archers are in a single-file line, one behind

the other, at each target. Be sure to control the activity so that no one nocks an arrow unless they are on the shooting line.

Modified Field Range

To set up a field range, an instructor should check within the community to find an appropriate site. A regulation field range would not be suitable for a basic archery class because the distances are beyond what students will be capable of hitting successfully. A modified field range should be set up using the distances shot in the lesson plans in this module—4, 7, and 10 meters.

An athletic field should not be used because lost arrows can cause an injury. If the site is rough terrain, scout it first for poison ivy, brambles, or other potential problems because archers will be searching for arrows behind the targets. Always clean up and leave the area as you found it.



Outdoor NFAA target face

TARGETS

Field target faces may be used, but they should be ones that students have shot at so the archers are familiar with scoring. If students are familiar with the scoring on animal targets, these may be substituted for field faces.

Attach targets to bales of straw or cardboard grocery boxes that have been anchored. If grocery boxes are used, stack several inside each other and practice shooting arrows to make sure the arrows do not pass through the boxes.

The shooting line for each target should be marked with stakes or flags. Each student stands behind the imaginary line and shoots four arrows at the target. The National Field Archery Association (1980, p. 38) specifies "4 arrows...from a single stake." When one student has shot four arrows, another student shoots. For beginners it is recommended that only two students shoot at one target at a time.

When everyone in the group has shot, the group goes to the target and scores the arrows. If any arrows have missed the target, instruct students to place a bow across the target before going to look for the missing arrows. This will alert other groups not to shoot at the target while the archers are searching for arrows. When all arrows have been retrieved and scored, the group moves to the next target.

Targets should be laid out in a clockwise or counter-clockwise direction similar to archery golf. It is recommended to allow at least 20 yards on either side of targets and beyond. Be sure the range is laid out so that at no time will a group be behind a target.

ARROWS

Use arrows with target or field points. Never leave any arrows in an area used for athletic events because buried arrows may cause injuries.

Adaptive Archery Equipment

Editor's Note: This section on adaptive equipment was written by Rick Flint, outdoor skills education specialist for the Department. Rick holds a bachelor of science degree in education from Missouri Western State College and a masters in secondary education administration from Southwest Missouri State University. He has conducted research on recreation activities for the handicapped. In 1979 he helped coordinate a handicapped training workshop for the Department and has traveled to other states to present programs on the subject.

Archery is truly an outdoor skill which can be enjoyed by everyone. Teaching the skill to a physically impaired or mentally retarded student may require some adaptive techniques. The basics of archery remain the same, however the method of teaching the basics must be adapted to the student. Before adaptations can be made, identification of the student's ability must be established. Once the ability has been measured, the instructor's creativity and skill at adapting teaching methods to the limited ability are of utmost importance.

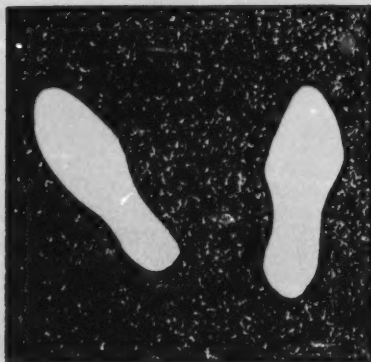
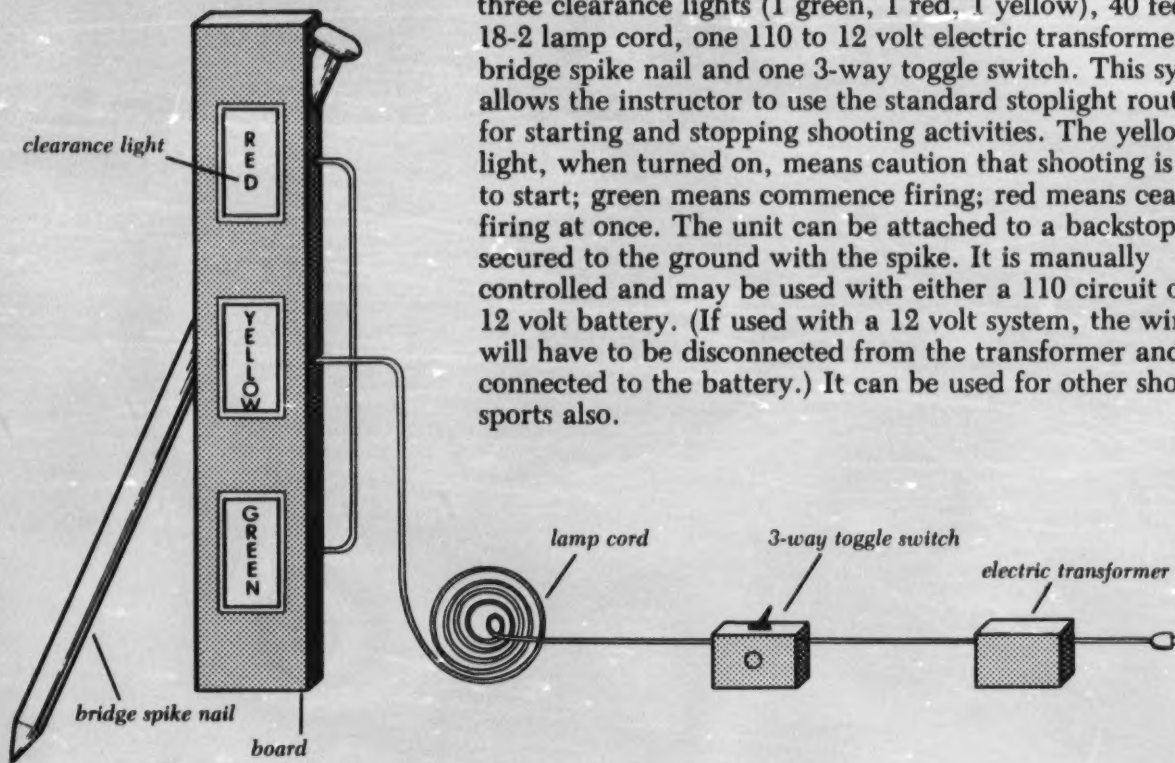
The following suggestions may assist in developing creativity and adaptive teaching.

1. Patience and persistence equal progress.
2. Positive attitude will induce positive motivation and develop a positive student.
3. Do not *overestimate* or *underestimate* the ability of your student.
4. Adapt your program to your students, not your students to the program.
5. Evaluate progress of students and provide rewards for correct performance. Let them know how they are doing and reinforce their correct responses.
6. Teach using easy steps and building each step on a previously learned response.
7. Alternate lecture with practical exercises to keep attention.
8. Repeat information frequently.
9. Keep instructional materials simple. Use pictures, events or objects to reinforce information.
10. Encourage students to be independent and work on solving their own problems.

ADAPTIVE EQUIPMENT

Hearing Impaired—One of the major problems encountered with the hearing impaired is eye contact with the student. A homemade lighting system will keep the instructor from having to stand in front of the shooter or continually use hand signals. The materials needed are

simple and will cost approximately \$30 per system. Materials include: one 2- x 4-inch board (24 inches long), three clearance lights (1 green, 1 red, 1 yellow), 40 feet of 18-2 lamp cord, one 110 to 12 volt electric transformer, one bridge spike nail and one 3-way toggle switch. This system allows the instructor to use the standard spotlight routine for starting and stopping shooting activities. The yellow light, when turned on, means caution that shooting is about to start; green means commence firing; red means cease firing at once. The unit can be attached to a backstop or secured to the ground with the spike. It is manually controlled and may be used with either a 110 circuit or a 12 volt battery. (If used with a 12 volt system, the wires will have to be disconnected from the transformer and connected to the battery.) It can be used for other shooting sports also.

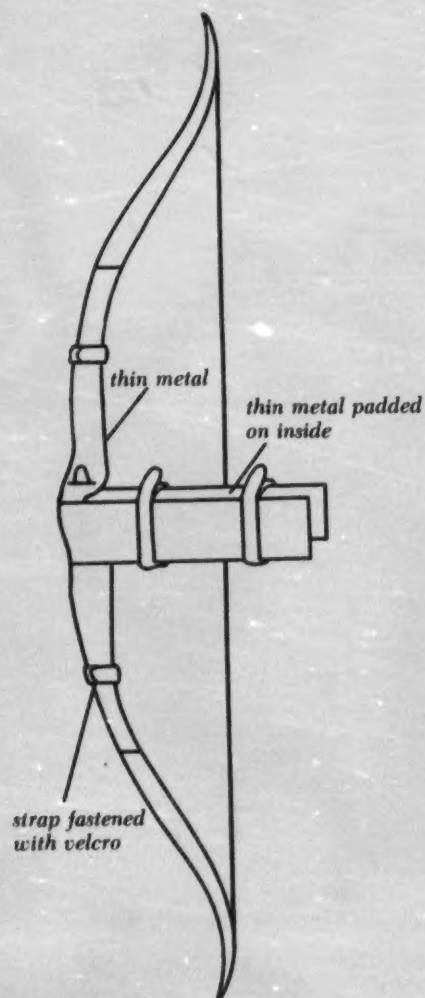
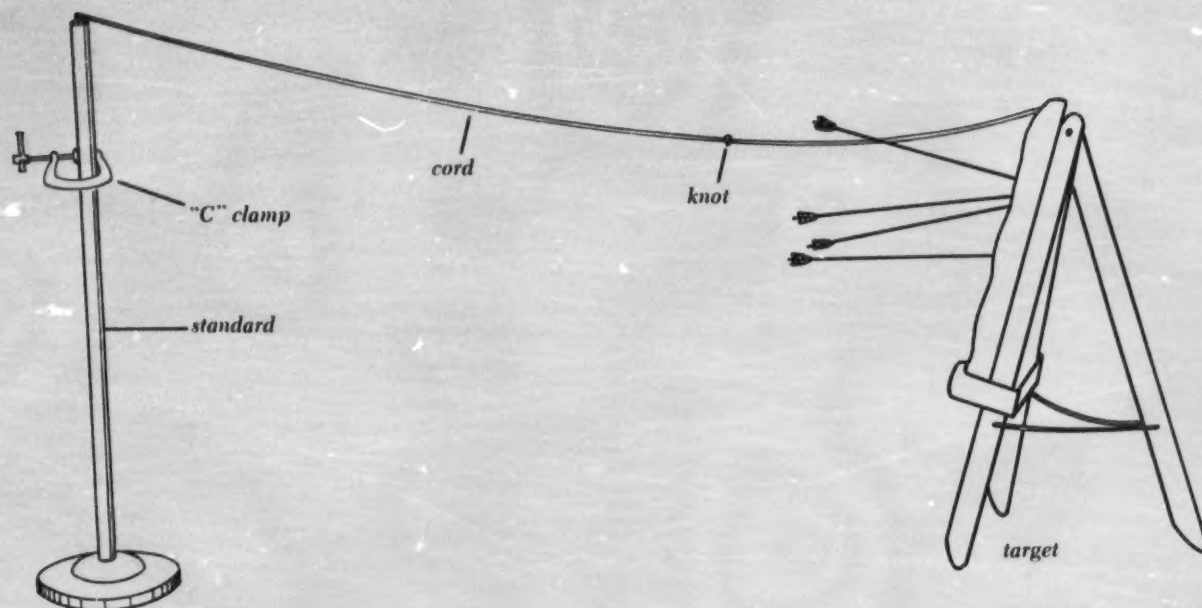


Carpet square with cutout footprints

Visually Impaired—There are several inexpensive aids that are effective in teaching archery to the visually impaired.

1. A carpet square helps maintain proper feet position. Cut out footprints which are aligned for archery shooting. The student, when standing without shoes, will be able to feel the floor or turf through the cutouts and maintain proper feet alignment. The instructor will have full control of the line of fire by instructing students to remain on the carpet squares.

2. A standard may be constructed to assist the student in finding the proper low target or "sight" alignment. Materials needed for the archery standard are one 5-foot section of $\frac{1}{2}$ -inch steel pipe (for durability), one wheel rim or disc blade for the base plate, one "C" clamp, 10 yards of heavy construction cord or rope. The "C" clamp is used as a guide for the archer's bow hand. It may be moved up and down to adjust the shooter's aim at the target. The standard itself may be moved right or left to adjust horizontal aiming. The cord is attached to the target or another standard located beside the target so the student can follow the string to the target to retrieve arrows. A knot should be tied approximately 3 feet from the target to warn the student to put out his free hand to feel for the target and any arrows that may be sticking in the target.



Bow with prosthetic extension

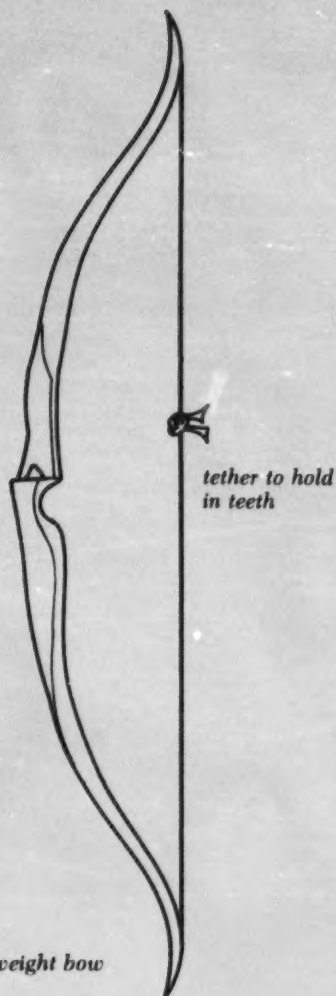
3. The visually impaired can score their own targets if targets are made from materials which are different in texture, such as felt for the 10 ring, foil for the 9, burlap for the 8, and so on. Another method of adapting the target is to glue string around the dividing lines of the target. The student can easily feel where the arrow has hit the target and score accordingly.

Orthopedically Impaired—The adaptations made for the orthopedically handicapped are going to depend upon the severity of the handicap. For those confined to a wheelchair, the position of the chair in relation to the target is important. You should experiment until you have a good position.

Most important is the length and draw weight of the bow. There must be sufficient ground clearance for the lower limb of the bow when released. The draw weight of the bow is also critical. The muscle strength and coordination of the physically impaired may call for an ultra-light training bow. The Black Widow 8-pound recurve bow (available from Black Widow Bow Company, Republic, Mo.) may be one answer. It can be used with all students and is a versatile piece of equipment.

A simple prosthetic device may be used with anyone missing part of an arm. An extension made of metal can be strapped to the arm stump and bow, which allows the amputee to shoot. If there is not a sufficient amount of arm for attaching a prosthesis, a light-weight bow and teeth tether may be used. The archer merely draws the bow using his teeth.

Mentally Retarded—When working with the mentally retarded, it's necessary to assess whether they are mildly, moderately or severely retarded and adapt teaching techniques accordingly. A one-to-one ratio of student and teacher is the best adaptation for teaching the mentally retarded. It is necessary when working with these students to adapt teaching techniques as well as equipment. The primary technique for teaching is repetition. Remember that once the concept is learned it will be remembered; it's learning the concept that is the problem. The instructor should not overestimate the ability of the student in the beginning, and not underestimate the development at the end.



Lesson Plans

The following lessons are planned so that each should last approximately one hour. They are arranged so an instructor may use only the first five lessons if time does not permit 10 lessons. Therefore, high anchor, which is easier to teach, and scoring on colored FITA faces, which is less confusing, are included in the first five lesson plans. Included in both sets of five lessons are one anchor, one type of scoring, and one novelty event.

During the lessons, students should learn scoring. If they realize the rounds they are shooting are simple versions of national championship rounds, and that state, national, and international rounds are shot at distances up to 90 meters, they may better appreciate the skill displayed by archers in these rounds.

In this module, targets and distances are given sometimes in feet and yards and sometimes in meters. There is a trend in archery toward switching to the metric system. Some target faces that in the past were in inches now can be purchased only in metric measurements. It's important to be flexible.

Instructors should not begin a new lesson until the skills preceding that lesson have been thoroughly covered. A class should progress at its own rate for more enjoyment and much less frustration. It is better for students to master only three lessons in five hours than to rush through five lessons with minimal success.

If some lessons must be skipped because of time limitations, omit some of the novelty events.

No. 1

- Title:** Introduction to Archery
- Method:** Lecture, class discussion, class activity
- Time:** One hour
- Purpose:** For students to:
1. Learn what criteria will be used to evaluate them, if an evaluation is required (such as in a school situation).
 2. Learn proper safety procedures and care of equipment.
 3. Learn the role of archery in history; how archery is used today; what can be expected of the sport; and what they may contribute to the sport.
 4. Determine which is their dominant eye.
 5. Determine what is their proper arrow length.

6. Find out what equipment will be used during the next lesson and how it will be assigned; and where the class will meet.
7. Learn how to string and unstring a bow.

Instructional Aids:

1. Films from the Athletic Institute (available from the Missouri Department of Conservation)—“An Invitation to Archery” and “Fundamentals of Archery: Basic Shooting Technique.”
2. Projector.
3. Safety posters.
4. Yardstick, clipboard, paper, and pencil.
5. Bow for each student.
6. Example of arrow, arm guard, and finger tab.

Facilities:

Classroom or other area where films can be shown.

Instructor Preparation

1. Review the following sections in this module: Introduction, History, Ethics, Equipment, and Preliminaries in the Classroom.
2. Be prepared to lead a discussion on history and ethics.
3. Be sure you understand how to help students find their dominant eye and draw length (arrow length).
4. Contact a Department of Conservation Outdoor Skills Specialist to order the films. Preview the films. These two films on beginning technique are excellent, and some historical illustrations of various types of archery are given.
5. Have all equipment ready, and bows should be strung.
6. Practice (so you can demonstrate):
 - a. Stringing and unstringing the bow.
 - b. How to put on the arm guard, finger tab, and quiver.
7. Check out the area where the class will be shooting in Lesson No. 2. Decide on safety rules that will be necessary for the class. Make a poster showing these rules.

Procedure

LECTURE AND DISCUSSION

1. Introduce yourself; have students introduce themselves.
2. Discuss what you hope they will gain from this course, emphasizing enjoyment and fun.
 - a. What degree of skill you expect (see the section on Evaluation in Lesson No. 8).
 - b. Knowledge of equipment (tackle): names of its various parts, preparation for shooting, storage, and care.
 - c. Understanding of how archery fits into the world historically, up to the present.
 - (1) Past use in warfare.

- (2) Present use in competition. (Archery was first allowed in the Olympics in 1972. Until 1980, the United States has won the gold medal in both the men's and women's competition.)
 - (3) Present use in recreation and bowhunting; how good archers can help the outdoors by game harvesting and proper care of the outdoors; how poor archers can hurt the outdoors by injuring game, littering, etc.
3. Ask your students if anyone has had any experience in archery and find out how much.
 4. Show films. Discuss the films, emphasizing important parts on history, equipment, and safety.
 5. Answer any questions the students have about material presented so far.
 6. Help each student find which eye is the dominant one. Emphasize that it is important they shoot with their right hand if their right eye is dominant (and vice versa).
 7. Measure each student's draw length; record, so the correct length arrows can be assigned for Lesson No. 2.
 8. Discuss where the class will meet for Lesson No. 2, where they will go for their equipment (tackle), and how the tackle will be assigned. Show them a bow, arrows in a quiver, arm guard, and finger tab.
 9. Show the safety poster. Discuss safety rules that are pertinent before Lesson No. 2, especially rules on how to dress. Emphasize that a bow is not a toy and nothing is to be done with a bow unless you have discussed it with them.
 10. If there is time, show how to string and unstring a bow, using a stringer. Have them each take a bow and a stringer and do this with you. (If there are not enough stringers, have them share; you then take each group through the procedure.) If there is not enough time for the instruction in stringing and unstringing a bow, this can be done in Lesson No. 3.

Evaluation

The instructor should consider the following questions after the class is over:

1. Did the class seem excited about learning this sport?
2. Did they seem to understand how archery fits into today's outdoor world?
3. Did the class understand how to find their dominant eye? If so, do you feel they will shoot according to their dominant eye? (You might jot down the names of the students whose dominant eye differs from their "handedness," to remind yourself to guide them into shooting according to their dominant eye.)
4. If there was time to string and unstring the bow, did they understand the procedure? (They should be carefully guided through this activity at least one more time.)

- Title:** Learning to Shoot
- Method:** Demonstration, discussion, class activity
- Time:** One hour
- Purpose:** For students to:
1. Learn and use safety rules on the range.
 2. Learn how to shoot a few arrows, using the following steps:
 - a. Stance
 - b. Bow hand position
 - c. Nocking arrow and string hand on string
 - d. Seating bow arm and draw
 - e. Aiming
 - (1) high anchor
 - (2) setting bow arm elevation
 - f. Release and follow-through
 - g. Retrieving

- Instructional Aids:**
1. One target per four students (placed 1 to 2 yards apart).
 2. Backstop net, if available. (If not, be sure there is a safe area behind the targets.)
 3. A 36-inch colored FITA face on each target, put on with target staples or shingle nails.
 4. One bow for each student. (If you have over 10 in a class, assign one bow for every two students.)
 5. Four arrows, arm guard, finger tab, and quiver for each student.
 6. One or two stringers.
 7. Poster on safety.
 8. Shooting line 4 meters from face of target.

Facilities: Gymnasium or outside area. If outside, a clear space at least 20 yards on each side of the end targets and a clear space at least 30 yards beyond the targets (if no backstop net). If inside, backstop net. Any entries to shooting area should be blocked off.

Instructor Preparation

1. Assign arrows according to each student's draw length and post assignments.
2. Be sure arrows have an identification mark (number or color), so each student's arrows are distinguishable.
3. Post bow assignments. (If there are more than 10 students, bows may need to be shared.)
4. Have net strung, targets set up (with 36-inch faces attached), and shooting line marked.

5. Review the sections in this module on Mimetics and Learning to Shoot, so each step can be demonstrated in good form.

Procedure

ASSIGNING EQUIPMENT AND TARGETS

1. Have students gather around the cart where equipment is stored.
 - a. Each student gets a quiver, an arm guard, and four arrows.
 - (1) Explain that the arrows go in the quiver. Demonstrate how to put the quiver on the belt. The S hook goes over the belt on the right side of archers shooting right-handed, with feathers toward the front of the body (reverse for left-handed archers).
 - (2) Demonstrate how to put on the arm guard. It will go on the inside of the left forearm for right-handed archers. The taper will go toward the wrist.
 - b. Discuss how a finger tab is placed on the right hand (if the archer is right-handed). Most finger tabs allow the archer to place the middle finger through the hole. Place the other two fingers so that all three finger tips are covered. It is important that the tab not be too large. Each student should get a finger tab that fits.
 - c. Assign bows to the students. If Lesson No. 1 included stringing the bow, review this with the class, checking each bow carefully. (If Lesson No. 1 did not include stringing the bow, you should have strung the bows before class.)
 - d. Have students place strung bows on the bow rack with string side up.
2. Place the students at the shooting line and assign targets. Then have them sit down behind the shooting line. (This prevents their "milling around" and usually keeps them from using the equipment.)
3. Review safety procedures and check the archers' clothing for string clearance.

DEMONSTRATION AND CLASS ACTIVITY

1. Demonstrate the steps of shooting, with the class in a safe area if you actually shoot an arrow.
2. Demonstrate and have class do mimetics, *without tackle*, behind the shooting line.
3. Have class remove quivers, put them in a safe spot, and get bows.
4. Demonstrate and have class do mimetics, *with bow only*, at the shooting line in assigned area they will be in when shooting. If they have partners, have partners check for string clearance, etc. If students are not sharing equipment, have every other archer step back

Caution: Emphasize to students that no one is in front of an archer drawing a bow, even if no arrow is nocked.

from the shooting line and to the side so they can see the archers' front and can help check for string clearance during the first few lessons. If a student is found to have a hyper-extended elbow at full draw, even when using the proper form, or if there is any question of string clearance, assign the student a long arm guard.

5. Have students place bows on rack. Review all the steps of shooting, emphasizing that an archer who has a problem keeping an arrow on the arrow rest during the draw should let down and start again.
6. Ask archers to get bows and arrows and go to the assigned areas on the shooting line. The instructor goes behind the line. Talk the students through the first arrow, emphasizing that if they omit any step, problems may result. Emphasize the danger of an arrow leaving the rest; discuss string alignment. Students might want to review full draw, checking string clearance, and relaxed string hand.
7. Talk through the steps of shooting slowly, emphasizing that a good anchor is important and that a student who is ready to release should not wait for the rest of the class.
8. Talk through three more arrows. Some students may get only one or two arrows shot. Explain that it is better to do one or two correctly than three incorrectly. When finished have the students step back from the line and put their bows on the rack.
9. Tell the students that after this you will just be giving the signal to shoot, either by voice or whistle, and it is up to the student to go through the steps of shooting. It is also important that the students remember to step back from the line after shooting the designated number of arrows.
10. If you have two lines shooting, take the second line through:
 - a. mimetics without tackle
 - b. mimetics with bow
 - c. shooting arrowsBecause it is important that all archers get to shoot on the first shooting day, you might want to limit both groups to only two arrows.
11. After all have shot and the line is clear, discuss the proper way to go to the target. Give the signal to retrieve (two whistles or the word "retrieve"). Have all students gather at one target. Demonstrate the proper way to retrieve arrows from a target. Appoint arrow-pullers for each target.
12. After everyone has their arrows, they return to the shooting line.
13. If there is time, let them shoot three more arrows and retrieve. If not, go to step 14.
14. Show students how to put up equipment properly.

Evaluation

1. Did all students shoot at least one arrow in good form?
2. Was the class conducted safely?

No. 3

Title: Using a Sight

Method: Class activity and demonstration

Time: One hour

Purpose: For students to:

1. Review shooting at a close distance (4 meters), with special emphasis on the anchor.
2. Learn how to use a sight and to adjust the sight for different distances.
3. Learn to string and unstring a bow (if not taught in Lesson No. 1).

Instructional Aids: See Lesson No. 2; however, each student now should have six arrows.

Facilities: See Lesson No. 2, with the addition of a 7-meter shooting line.

Instructor Preparation

Review the sections on Safety. Review the steps in Learning to Shoot—especially note common errors at this stage, high anchor, and the use of a sight.

Procedure**CLASS ACTIVITY**

1. Review rules of safety.
2. If students learned to string and unstring a bow in the first lesson, review that. If they did not, demonstrate stringing and unstringing and have the students do it with you.
3. Review steps in shooting. Place students on the shooting line. Give signal to shoot (one blast of the whistle or the word "shoot"). Talk them through the first arrow. Have them shoot two more arrows.
4. When all have shot, the line is clear, and the bows are on the rack, review signals and how to retrieve. Have students retrieve arrows. Watch to see that they are retrieving correctly.
5. The shooting line should be at 4 meters, as in Lesson No. 2. Show students how to set a sight above the arrow rest (approximately 3 inches for those with a

Emphasize the proper form on all steps and the importance of a good anchor.

24-inch draw; approximately 5 inches for those with a 30-inch draw). See the section on Learning to Shoot—Sight Aiming. Go through the steps in learning how to use a sight. Emphasize the proper form on all steps and the importance of a good anchor. Students shoot two arrows and adjust sights in the direction of error. If they have partners, the partner can check the anchor to see if it is always in the same place. Students shoot four more arrows.

6. When all have shot, have them retrieve.
7. When archers are grouping fairly well at 4 meters, move back to a 7-meter line. Lower the sight pin approximately 1/2 to 3/4 inch. Emphasize that students are to follow the steps of shooting more carefully now, since the further back they go, the bigger an error becomes. Have them shoot three arrows and adjust the sight, if necessary. They should shoot three more arrows. After all have shot, retrieve.
8. Have them shoot as many arrows as possible at the 7-meter distance. During each end, you should move back and forth behind your students, helping those having difficulty.

Evaluation

1. Did students seem to understand the use of a sight?
2. Did the arrow groupings for each student get smaller the longer they shot?
3. Did the students follow safety procedures?

No. 4

Title: Scoring a Modified Target Round

Method: Class activity and discussion

Time: One hour

Purpose: For students to:

1. Improve arrow grouping on each end shot.
2. Understand simplified rules of scoring (NAA).
3. Experience shooting and scoring a modified round.

Instructional Aids: Same as Lesson No. 3, with the addition of a clipboard, score sheet, and pencil for each target; if possible, a blackboard to show scoring; if not, a large poster showing a sample score sheet.

Facilities: Same as Lesson No. 3.

Instructor Preparation

Review the steps in Learning to Shoot. Review scoring using NAA rules. Reread the section on Scoring and Rounds. Get one score sheet ready for each target.

Procedure

DISCUSSION

1. The students will learn how to score a modified target round using NAA rules. This is a round made up for this module, using the distance the class has shot and the target the class has used. But the rules of scoring are NAA rules for FITA faces. This way, the class learns simple but correct rules of scoring.

This round is shot at the 36-inch FITA face at the 7-meter distance. Consider the success of the class at the 7-meter distance. Students can learn scoring from 4 meters as well as 7 and they might have more success and fun at the shorter distance. Twenty-four arrows will be shot, six arrows per end, shot three at a time. Scoring will be 10 and 9 for gold, 8 and 7 for red, 6 and 5 for blue, 4 and 3 for black, and 2 and 1 for white.

Judge the number in your class and the speed of the archers. You may wish to shoot 12 arrows or two ends in the time you have. If you want to evaluate both distances, shoot half the ends at 7 meters and half at 4 meters, in that order.

2. Appoint a scorer for each target. Give each of the scorers a clipboard with a score sheet and a pencil. (A sample score sheet is shown in the section on Scoring and Rounds.)
3. Appoint a target captain who will supervise retrieving and scoring.
4. Show the class a large example of the score sheet on a poster or the blackboard. Score an end. (You should have shot an end before class, or stuck arrows into the target face, so that students can see how arrows might be in the target during an end.) Ask if there are questions.
5. Emphasize that students are to follow safety procedures and good form: doing so will give good scores. Discuss a realistic expectation for each end: all arrows score, or four arrows score, etc.

CLASS ACTIVITY

1. Students shoot six arrows (three at a time) for practice at distances used for this round. Retrieve.
2. Students shoot and score the round using proper rules. Each end will consist of six arrows, shot three at a time, if archers share equipment. The scorer scores the six arrows in the spaces provided, highest-scoring arrow first, lowest-scoring arrow last. Total to the right: number hits (times the score of the area hit) and total score for that end (six arrows).

3. Discuss scores. Emphasize that good form is as important as scores at this stage.

Evaluation

1. Did students learn and follow the rules of scoring a target round?
2. Did students continue using safe procedures and good form? (This is usually a problem at this stage, unless you emphasize that good form brings good scores and that carelessness or omission during one step can cause the arrow to be poor.)
3. Did students feel successful or at least satisfied with their progress? (This, again, is up to you as their instructor. A round where every student is disappointed except the one who got the best score is a poor experience for the class.) If this round is to be used for evaluating the students, see the section on Evaluation in Lesson No. 8.

No. 5

Title: Novelty Event (Tic-Tac-Toe)

Method: Discussion and class activity

Time: One hour

Purpose: For students to:

1. Learn a novelty game.
2. Review the first four lessons.

Instructional Aids:

1. Regular equipment; six arrows per student.
2. Approximately 30 balloons.
3. Eighteen target staples or shingle nails.
4. Two targets.

Facilities: Same as Lessons No. 2, 3, and 4.

Instructor Preparation

1. Review the section on Novelty Events.
2. Divide the class according to the scores they attained in Lesson No. 4 so that there are two teams of approximately equal ability.
3. List the team members alphabetically (not by score).

Procedure**DISCUSSION OR EVALUATION**

1. Ask students questions on material in the first four lessons. For example: (a) Describe or show a high

No one nocks an arrow unless they are on the shooting line.

- anchor. (b) If arrows are grouping low, in what direction do you move the sight? (c) How is an arrow scored that cuts through lines? (See suggested test questions.)
2. Balloons are blown up, tied, and attached to each of the two targets in three rows of three.
 3. Give the rules of the game, emphasizing safety requirements. Each team is lined up in single file, facing their own target. It is important that students understand that only one archer on a team shoots at a time, and then only one arrow. No one nocks an arrow unless they are on the shooting line. If there seems to be a safety problem, have the students leave their quivers at the shooting line so there is no access to arrows behind the line.
 4. Select a shooting line from which the class has shot, perhaps 7 meters. If the class is unsuccessful at this distance, move up to a 4-meter line.
 5. Place each team in a single-file line facing their target.
 6. Emphasize safety again and tell them to take their time when shooting, so that their arrow will break a balloon.

CLASS ACTIVITY

1. Give the signal to start the game.
2. When one team has three balloons broken in a line (across, up and down, or diagonally) on their target, the game is over. Call "halt." All step back from the line; then all retrieve.
3. Blow up balloons to replace those broken on both targets and play a second game. The teams can play the best two out of three, the best three out of five, or whatever seems to fit the time available.
4. If during the game, everyone has shot six arrows and neither team has won, or if the targets become too crowded with arrows, signal for students to stop shooting and have everyone retrieve arrows. They then return to the shooting line and finish the game.

Evaluation

1. Were the safety procedures followed?
2. Did the students clean up the broken balloons in the area around the targets?
3. Did students enjoy this activity?

The following lessons—a continuation of the first five—are for the instructor who wishes to teach 10 lessons.

Title: Low Anchor

Method: Class activity

Time: One hour

Purpose: For students to try the low anchor and decide which anchor they wish to use.

Instructional Aids:

1. Regular equipment; five arrows per student.
2. For each target: 1 indoor field face (blue 40 cm).
3. A shooting line for three distances: 4 meters, 7 meters, and 10 meters.

Facilities: Shooting area with targets. See Lesson No. 2.

Instructor Preparation

1. Review mimetics and how to teach low anchor. Be able to demonstrate.
2. Review NFAA scoring in section on Scoring and Rounds.

Procedure

1. Review good shooting techniques and safety rules.
2. Shooters go to the 4-meter line. Demonstrate low anchor, emphasizing that some students are already going to this anchor naturally and others will find it easier.
3. Have students try the low anchor, going through the steps in learning as they did with the high anchor.
4. Have the students set their sights approximately 1 inch above the sight setting for high anchor. They shoot five arrows using low anchor (adjusting sight after two arrows if necessary). When line is clear, retrieve.
5. Place field faces on each target. Aiming is no different from aiming at a 36-inch face: the archer still places the pin in the center of the target face.
6. Students shoot four more arrows at these faces using low anchor. When the line is clear, retrieve.
7. Students should move back to the 7-meter line and adjust their sights lower because of the increase in distance. Have them shoot five arrows. When the line is clear, retrieve.
8. If there is time, students should move back to the 10-meter line, again adjusting their sights for the distance change. Have them shoot five more arrows. When the line is clear, retrieve.
9. Have students select anchor they wish to use.

During each end, you should move back and forth behind the line helping those having difficulty.

Evaluation

1. Did the student seem to select the proper anchor?
2. Are students gradually becoming more successful? As the students move further back from the target, and as they progress to smaller targets, they will become discouraged. It is up to you to emphasize that they are in more challenging situations; therefore, they cannot expect to be as successful. Emphasize that you are proud of their progress.

No. 7

Title: Review

Method: Class activity

Time: One hour

Purpose: For students to:

1. Review the steps of shooting.
2. Set their sights for the following distances: 4 meters, 7 meters, and 10 meters.

Instructional Aids: Same as Lesson No. 6.

Facilities: Same as Lesson No. 6.

Instructor Preparation

Review all material on shooting so you can help students with problems.

Procedure

1. Tell the class they will be shooting and scoring at three distances in Lesson No. 8. It is important during this lesson that each student set sights for each of these distances. Emphasize using good form so they can be as accurate as possible.
2. Remind them that they must adhere to the anchor they chose; otherwise, their sights will not work successfully.
3. Students shoot five arrows at 4 meters. Retrieve.
4. Students shoot two to three ends (five arrows each end, then retrieve) at 7 meters, until the class has fairly good groups.
5. Students should move back to 10 meters and change their sights. Have them shoot three to four ends. Retrieve. Students who have decided to go back to the

high anchor will not have shot at this distance, so they will need help adjusting their sights.

Evaluation

1. Are archers using good form?
2. Are archers keeping one anchor?

No. 8

Title:

Scoring a Modified Field Round
(Instructor may wish to substitute outside field range for this lesson, using the distances in No. 7. If so, use outdoor faces, shoot from behind the line, and use 50 cm and 35 cm target faces.)

Method:

Discussion and class activity

Time:

One hour

Purpose:

For students to:

1. Learn NFAA rules on scoring an indoor round.
2. Experience shooting and scoring using these rules.

Instructional Aids:

Same as Lesson No. 6, with the addition of a clipboard, score sheet, and pencil for each target.

Facilities:

Same as Lesson No. 6.

Instructor Preparation

Make score cards. Review National Field Archery Association scoring.

Procedure

DISCUSSION

1. The students will learn how to score a modified field round using NFAA rules. This is a round made up for this module, using distances the class has shot. The rules of scoring are NFAA rules.
2. Appoint scorers who have not scored before. Give each scorer the scoring material.
3. Appoint a target captain for each target who will supervise retrieving arrows and scoring (someone who has not done this before).
4. Show the target. Discuss how arrows are scored hitting each area. Emphasize that only arrows hitting the designated face for that end will count.
5. Demonstrate how the scorer records scores.

CLASS ACTIVITY

1. Students shoot five arrows from 7 meters. (This will be

- the practice end: do not score.) Retrieve.
2. Shoot five arrows from 7 meters. Retrieve and score.
 3. Students shoot five arrows from 4 meters.
 4. Students shoot five arrows from 10 meters. Retrieve and score.
 5. If time, shoot another 5 arrows from 10 meters. Retrieve and score.
 6. Have scorers total score. Discuss how you feel the class has done. Compliment their accuracy; emphasize that they have not had much practice, but you notice they are all using proper form, which will give them accuracy with practice. But be honest—if they are not using good form and are rushing shots, bring this to their attention.

Evaluation

1. Did students score up to what they should be doing at this stage? If this lesson is used to formally evaluate the skill of the students, do not use this criteria without also considering the following:
 - a. Does the student use good form?
 - b. Does the student consciously try to do each step properly, without hurrying?
 - c. Is it advisable to have students shoot a second round, exactly like this one, which would show students' consistency and make up for a possible bad day? (Sometimes, if they know they will have a second chance, they relax and do a good job.)
2. If you must evaluate the students, and you go through this lesson a second time, omit Lesson No. 10 (Archery Golf).

No. 9

Title: Modified Animal Round

Method: Discussion and class activity

Time: One hour

Purpose: For students to gain experience in a novelty game, using animal round scoring and targets.

Instructional Aids:

1. Regular equipment; three arrows per student.
2. One animal face for each target: a different size face on each target. It is advisable to have target faces as large as possible for success: 24 to 36 inches would work well.

Facilities: Same as Lesson No. 7.

Instructor Preparation Review the section on Scoring and Rounds.

Procedure **DISCUSSION**

1. This is a round made up for this module, using the distance the class has shot, but the rules on the NFAA animal round faces are used.
2. Appoint a scorekeeper and a target captain for each target.
3. Bring the class to a target. Show the center scoring area. Show the outer scoring area. Archers shoot one to three arrows: only one arrow scores. Emphasize that once an arrow goes at least into the outer area, they are to stop shooting. An outer area shot on the first arrow counts more than an inner area shot on the second arrow, so there is no reason for them to continue shooting. Beginning archers often think they can improve their score on a later arrow closer to the center, so you must explain the scoring carefully.

If students are unsure whether they hit at least the outer area on an arrow, another arrow may be shot. When scoring, decide which was the first arrow to score and give the score accordingly.

4. Discuss the fact that this event, when done by archery clubs, takes place on a regulation field course (as much as an 80-yard shot). In those cases, arrows are numbered 1, 2, and 3. If an archer is unsure whether the first arrow is in the outer area, the second arrow is shot. Then, in scoring, if the first arrow is in the scoring area, it is scored and the second arrow is ignored. If the first arrow does not score, the second

arrow is scored.

CLASS ACTIVITY

1. Have students go back to the 10-meter shooting line. Have them shoot three arrows as a practice end. Retrieve. Do not score.
2. Have students go back to the shooting line. Have them shoot one to three arrows. When the line is clear, they should retrieve and score. Scoring points for each arrow are usually written in the corner of the targets. While the class is at the targets, instruct them to rotate to another target for the next end. Have students look at their new target and become familiar with it before going back to the shooting line.
3. When all have rotated properly, they shoot at the next target. Retrieve and score.
4. Continue this until the class has shot at all of the targets.
5. Discuss scores. The class can have individual winners and group winners (use an average, since there may be a different number of archers in each group). If there are to be group winners, discuss this at the beginning of the lesson so the members of the group can encourage each other.
6. If there is time, repeat; or move up to closer distances and repeat the entire round.
7. Discuss archery golf with the class and tell them where they will meet for the next lesson.

Evaluation

1. Did students understand the scoring?
2. Are they continuing to improve on grouping?

No. 10

Title: Archery Golf

(If there is insufficient space, another novelty event may be substituted. If you want to evaluate the class and do not have time for both Archery Golf and testing, then substitute an examination.)

Method: Discussion, class activity, written evaluation

Time: One or two hours. This lesson works better in a two-hour segment, but it can be done in a one-hour segment if the place where the students get their equipment is fairly close to the shooting area. If not, and it is possible for the instructor to take the equipment to this area, the lesson can still be done in one hour. Additional time should be allowed for testing.

Purpose:

For students to:

1. Learn a modified game of archery golf.
2. Become aware of special safety hazards and follow the rules of the game carefully.
3. Shoot a flu-flu arrow, noticing flight characteristics.
4. Take a written exam to test their knowledge of basic archery.

Instructional Aids:

1. Regular equipment to shoot, substituting one 30-inch flu-flu arrow with a blunt tip for a regular arrow.
2. For each "hole," an elevated target.
3. For each "tee-off" area, two markers.
4. For each "foursome" (or group moving together), a score card and pencil. (Just a card on which to jot down scores is sufficient; it does not have to be detailed.)
5. A whistle for the instructor.
6. Copies of written examination for students, if needed.

Facilities:

An area at least the size of three football fields (the larger the better). If there is not sufficient space, substitute another novelty event or give students an examination.

Instructor Preparation

1. Review the section on Novelty Events.
2. Set up the course. Walk it off, making sure there is a 20- to 30-yard clearance on both sides of a line from the tee-off area to its target. Be sure the tee-off area for each target is at right angles to the previous target.

The instructor should actually set up the entire area and shoot around the course, with experienced archers shooting at the targets just ahead of and behind the instructor. This way the instructor sees possible danger areas where one target area crosses another and can revise the course.

Procedure**DISCUSSION**

1. After the class gets their equipment, take them to an area where all of the targets can be seen (probably the center of the course). Show them the course and how they are to move around it.
2. Give the rules, emphasizing safety.
3. Divide the archers into four or five groups. Give the scorer for each group a card and pencil.
4. Assign a specific target for each group. Each group will be assigned a different tee-off area. When all are in position, each group will start at its particular target. This way all will start at the same time and, hopefully, finish all the targets at the same time. (For example, one group will shoot in order targets 1-2-3-4-5; another

- will shoot 3-4-5-1-2, etc.) Be sure they understand the direction they are to go and the group they follow.
5. Emphasize safety rules again.

CLASS ACTIVITY

1. Groups move to targets. Place yourself where you can see all the archers. Watch them carefully. If unsafe procedures occur, blow the whistle, stopping all archers. Go to the group that you feel needs help. After the problem has been resolved, all groups proceed around the course.
2. When all have finished the course, all come in bringing course equipment with them. Discuss scores.

DISCUSSION AND WRITTEN EXAMINATION (if needed)

Review what the class has learned in the previous lessons. Administer the written examination.

Evaluation

1. Was this a successful finish to the series of lessons?
2. Did the group get to review all you thought was important?
3. Did the class successfully pass the written examination?

Glossary

AMO	Archery Manufacturers Organization. This group dictates regulation sizes on tackle.
ANCHOR (DRAW)	To pull the bowstring back to the anchor point.
ANCHOR POINT	The spot on the face to which the string hand is drawn, preparatory to shooting.
ARCHER'S PARADOX	The action of the arrow at release, bending around the bow and then stabilizing in flight to the target.
ARM GUARD	Protection for an archer's forearm.
ARROW LENGTH	Distance from bottom of nock to tip of arrow.
ARROW REST	Projection on bow on which archer places the shaft of the arrow.
ARROW SHELF	Projection on bow over which arrow lies (may or may not also be the arrow rest).
BACK	The area of the bow away from the bowstring (and the archer at full draw).

BACKSTOP NET	Net behind targets used to slow down and stop arrows that miss the target.
BAREBOW	Bow without a sight.
BOW ARM/BOW HAND	The arm/hand that holds the bow during a shot (left arm/hand if the archer is right-handed, right arm/hand if the archer is left-handed).
BOW RACK	Place near shooting line used to store bows when they are not in use.
BOW SIGHT	Apparatus attached to a bow above the shaft; it has a pin attached that is lined up with the center of the target.
BOW SQUARE	Commercial tool to check string height and nock location position.
BOWSTRING	String of a bow.
BOWSTRINGER	Device to string a bow to get it ready to shoot.
BRACING	Another term for stringing.
CLOUT	Novelty event in which an arrow is shot into the air, dropping to hit a target on the ground.
COCK OR INDEX FEATHER	Feather at right angles to strip (usually a different color than the other feathers).
COMPOUND BOW	Bow with series of pulleys that change (lighten) draw weight (let down) at end of draw.
CREEPING	Tip of arrow moving forward before release; it is caused by loss of back tension.
CREST	Color or marking on shaft to distinguish an arrow from others.
DRAW (ANCHOR)	To pull the bowstring back to the anchor.
DRAW LENGTH (ARROW LENGTH)	The distance from the back of the bow to the anchor at full draw.
DRAW WEIGHT (OF BOW)	The number of pounds of force necessary to pull the bow 28 inches.
DRAW WEIGHT (OF ARCHER)	The number of pounds of force necessary to pull the bow the draw length. (To calculate, begin with the draw weight of the bow. Then add or subtract approximately 2 pounds for each inch above or below 28 inches that the archer draws.)

END	A certain number of arrows shot before retrieving.
FACE	The area of the bow nearest the bowstring (and the archer at full draw).
FINGER TAB	Leather protection for string fingers.
FITA	(a) Federation International de tir a l'Arc, international archery organization (b) Rounds using the international rules.
FLETCHING	Vanes or feathers on arrows.
FLU-FLU	Arrow with feathers that aren't trimmed so there is more wind resistance and the arrow travels less distance.
FOLLOW-THROUGH	Movement of drawing hand and arm after release of string that is a result of the forces occurring before the release.
FREE-STYLE AIMING	Using a sight while shooting.
GAP	Distance seen by an archer between the tip of the arrow and the center of the target.
GROUPING	Spacing of an end of arrows. Goal is to have them come as close as possible to each other.
HEN FEATHERS	Two feathers of like color, which with like cock feathers, make the three-vane fletching.
HIGH ANCHOR	High place on the face where the string hand rests at full draw.
HIGH WRIST	One of two forms that the bow hand can take when holding the bow. In this form the wrist is at the same level as the thumb.
HIT	An arrow that hits the scoring area of the target face.
HYPER-EXTENDED ELBOW	The "straight" elbow bends past 180 degrees (sometimes called double-jointed).
INSTINCTIVE AIMING	Shooting without a sight on the bow (barebow).
JERKING	On release, the clutching or grabbing of the string rather than a gentle relaxation.
LET DOWN	The action of taking a fully-drawn bow back to the starting position without letting go of the string.
LIMBS	The upper and lower sections of the bow, which bend during the draw.
LOW ANCHOR	Position where string hand is below chin at full draw.

LOW WRIST	One of two forms that the bow hand can take when holding the bow. In this form the wrist is lowered so the base of the thumb rests against the bow.
MIMETICS	A term referring to drills preliminary to shooting that mimic the action of shooting but do not use complete equipment.
MODIFIED ROUND	A round that is neither NAA nor NFAA regulation but uses some of the rules of regular rounds.
NAA	National Archery Association.
NFAA	National Field Archery Association.
NOCK	(a) The slot in one end of the arrow into which the bowstring fits. (b) The action of placing the nock end of the arrow over the bowstring, preparatory to shooting.
NOCK LOCATOR	A marking or attachment on the string that identifies the exact place on the string that the arrow will be nocked.
NOCKING POINT	The place on the bowstring over which the nock of the arrow is placed.
NOTCH	A depression in the tips of the limbs of the bow in which the string is placed.
NOVELTY ROUND	A round that doesn't use regulation targets.
OVERDRAW	To pull the string and the arrow past the regular anchor point.
PIVOT POINT	The indented area on the face of the bow where the bow hand is inserted.
PLUCKING	Similar to jerking, plucking is usually done in a backward or outward (away from face) direction.
PULL	To take arrows from the target.
QUIVER	A device for holding arrows that are not being shot.
RANGE	Area where shooting is being done and which may contain one or more targets.
RECURVE	Form for a bow that involves two curves.
RELEASE	(a) A mechanical device that holds the string. (b) The action of relaxing the string hand at full draw so that the string pushes the arrow, starting it on its flight.
RETRIEVE	Act of recovering shot arrows.

ROUND	A certain combination of ends shot at certain distances.
SCORER	Person who writes down the scores of the arrows on a target.
SEATING	Act of setting or placing upper arm bone into the shoulder joint.
SHAFT	Main part of an arrow.
SHOOTING LINE	Line from which archer shoots. The rules may state that archer either have both feet behind line or straddle the line.
SIGHT	See Bowsight.
SIGHT PIN	Actual part of bowsight that is placed in the center of the target face.
SIGHT WINDOW	The cut-out area above the handle of the bow where the arrow rest is placed.
SPINE	Stiffness or flexibility of the arrow.
STANCE	The position of the feet during the action of shooting.
STRING	(a) The bowstring. (b) To place the bowstring in the notches of the limbs of the bow so the bow is ready to shoot.
STRING ALIGNMENT	Placement of the bowstring in relation to the bow.
STRING ARM/HAND	The arm/hand pulling the bowstring to the anchor point (right arm/hand if the archer is right-handed; left arm/hand if the archer is left-handed).
STRING CLEARANCE	The bowstring at release from full draw recovers to the string height it was before being drawn. The space between this route and the bow arm is the clearance.
STRING FINGERS	The fingers on the string hand (right if shooting right-handed) which pull the bowstring back to anchor.
STRING HEIGHT	The distance in inches from the bowstring of a strung bow to the pivot point of the bow.
TACKLE	A general term for archery equipment.
TARGET	An object made of a material that will stop an arrow and on which a target face is placed.
TARGET CAPTAIN	Individual responsible with the scorer for the scoring of the arrows on a particular target.

TARGET STAND	Device to hold the target in an upright position.
VANE	Plastic or feather fletching on an arrow.

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Teaching Aids

Following are some recommended sources for charts, pamphlets, and films that would be helpful in a beginning archery class. Some of the aids are indicated here, but the instructor should contact the organizations for a complete list of what is available.

Archery World (official publication of the NAA)
534 North Broadway
Milwaukee, WI 53202

Excellent posters on beginning techniques, intermediate techniques, bowhunting, etc. Pertinent to this module are:

- "1. Basics of Better Shooting
- "2. Better Ways to Higher Score
 - I. Stance
 - II. Nocking arrow, bow hand
 - III. Bow shoulder
 - IV. Anchor
 - Va. Dominant eye instructive aim
 - Vb. Sight aiming
 - VI. Completing the shot
- "3. Arrow Strike Patterns"

Bear Archery
R.R. 4

Gainesville, FL 32601

Equipment: School equipment module and storage cabinet

Films: "Archery Today," "Archery—Right On," "The Good Earth"

Pamphlets: "ABC's of Archery," "Archery Made Easy," "Instant Archery" (3 language booklet)

Posters: Target Equipment (22" x 28"), Hunting Equipment (22" x 28")

Books: *NAA Instructor's Manual*, *Archery Instructor's Guide*, *The Archer's Bible*, *Fred Bear's World of Archery*, *Archers Digest*, *Guide to Bowfishing*

Ben Pearson Archery

P.O. Box 7465

Pine Bluff, AR 71611

Poster: "Basic Archery"

Pamphlets: "Target Archer," "Bowhunting," and "Bowfishing"

Bowhunters Who Care
P.O. Box 476
Columbus, NE 68601
Bow and Arrow (magazine)
Box 111
Capistrano Beach, CA 92624

Jas D. Easton, Inc.
7800 Haskell Ave.
Van Nuys, CA 91406
Pamphlet: "Bowhunting"
Free films: "Archery—the Inner Game" and "Flight of the Arrow"

Missouri Department of Conservation has one set of five films produced by the Athletic Institute:
"An Invitation to Archery"
"Fundamentals of Archery: Basic Shooting Technique"
"Intermediate Shooting Technique, Part I"
"Intermediate Shooting Technique, Part II"
"Mastering the Bow and Arrow Sports"

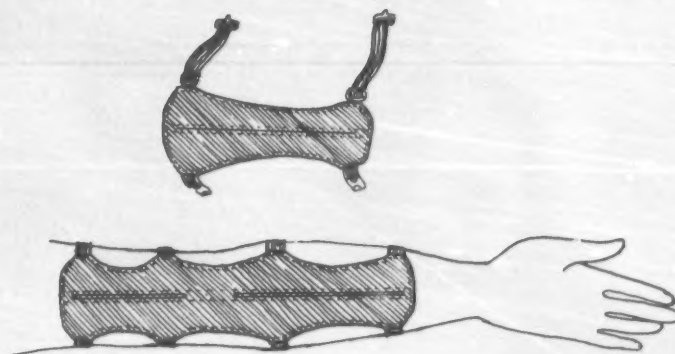
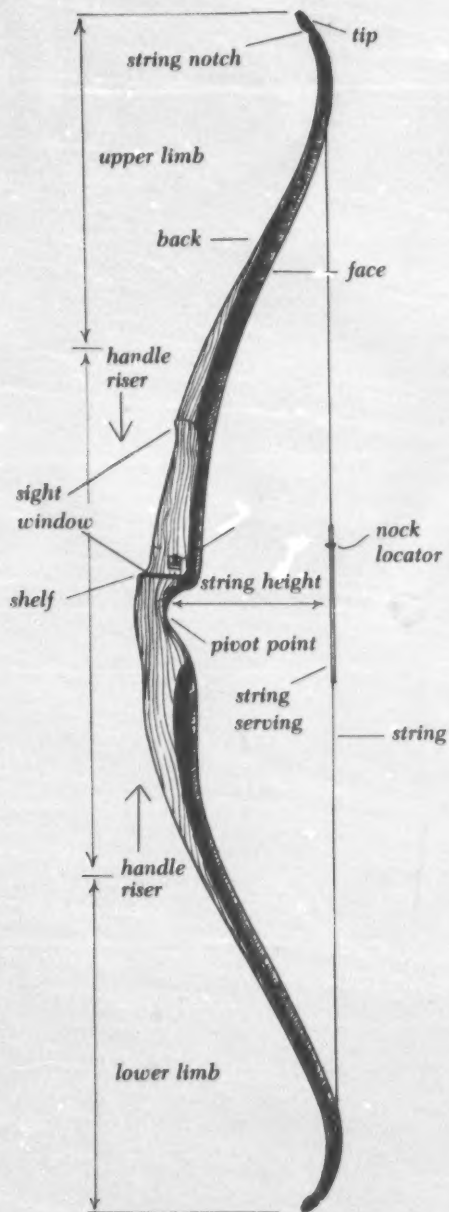
National Archery Association
1951 Geraldson Drive
Lancaster, PA 17601
Poster: "Nine Steps to the Ten Ring"
Archery World (magazine that is the organization's official publication)

National Field Archery Association
Route #2, Box 514
Redlands, CA 92373
"Archery School Kit"
Bow and Arrow (magazine that is the organization's official publication)

Saunders Archery Company
Box 476
Columbus, NE 68601
Free film: "Speed Round"
Handouts on bowhunting and basic bow tuning

Appendix 1—Archery Equipment

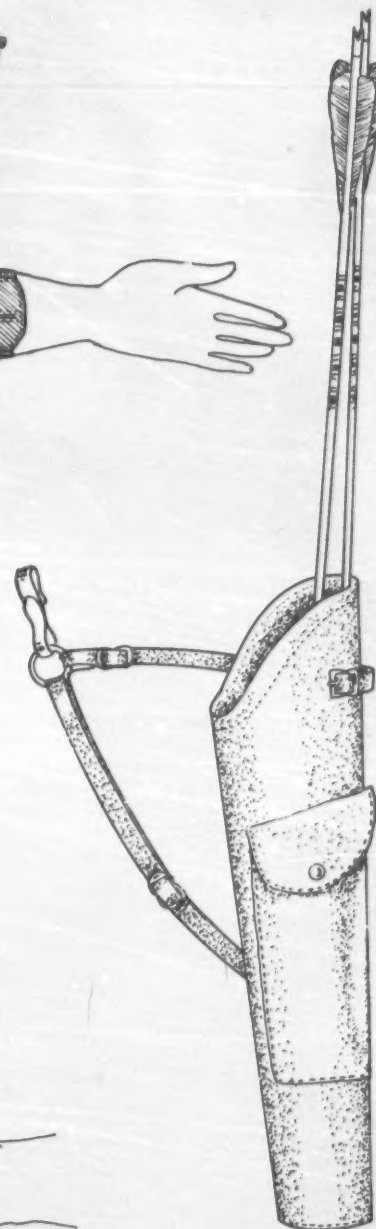
Bow



Arm guards

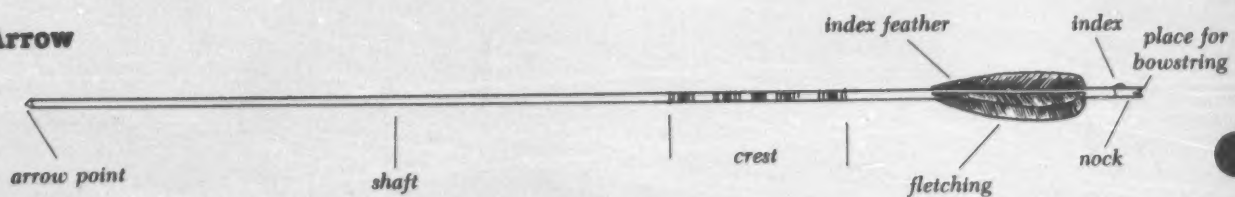


Finger tab



Quiver

Arrow



Appendix 2—Suggested Written and Practical Examinations

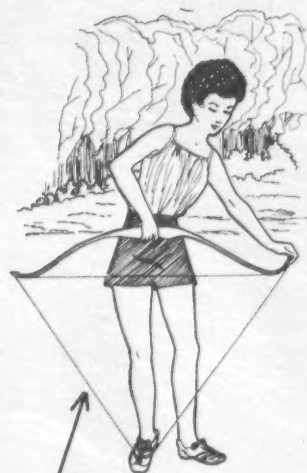
Written Exam

1. Identify the archery equipment shown and label the parts marked.

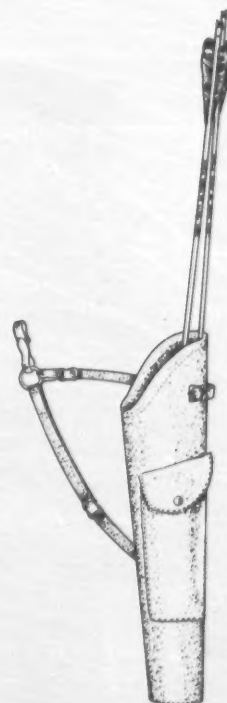
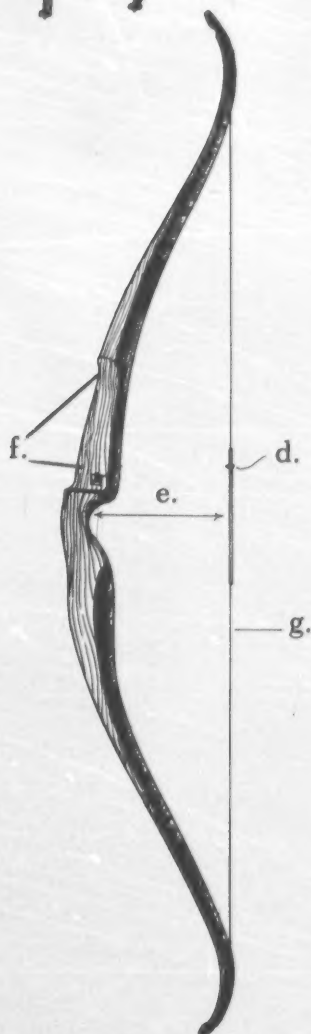


a. _____

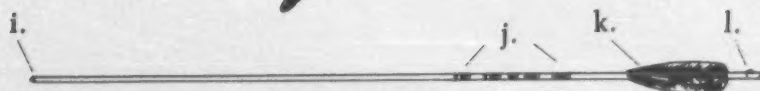
b. _____



c. _____



h. _____

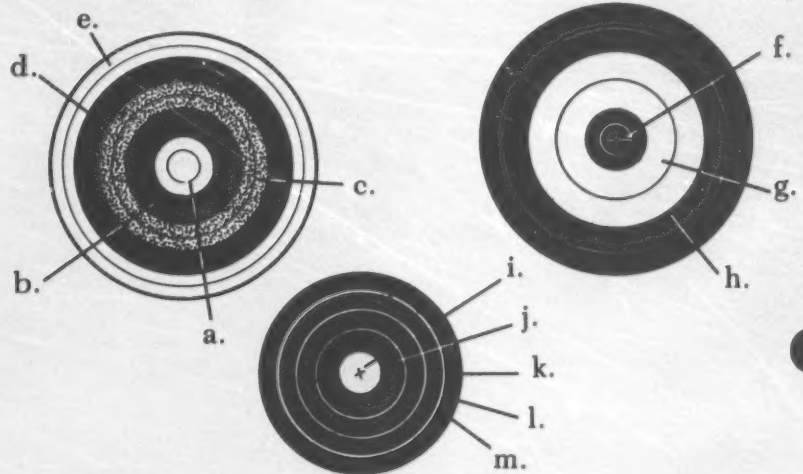


2. Define or describe the following terms:

- a. recurve bow
- b. end
- c. round
- d. high anchor
- e. low anchor

3. Between which two fingers is an arrow drawn?

4. Specify the proper score for each ring on the following targets:



5. Write a short essay describing how archery fits into outdoor skills today.

6. List three basic safety rules that should be followed when shooting on an archery range.

Practical Exam

To test your students' practical knowledge of the subject, ask them to do the following:

1. String and unstring a bow.
2. Properly remove an arrow from the target and from the grass.
3. Nock, draw, and shoot an arrow. (Check for proper form in draw, anchor, and release. Make sure bow, hands, and arms are in proper placement. Release should be smooth.)
4. Shoot a modified round with some degree of success. (Score should be 20 percent or more of total possible.)

When students are on the range, check that they are always using safe shooting procedures.

Instructor's Key to Written Exam

1.
 - a. finger tab
 - b. arm guard
 - c. bowstringer
 - d.nock locator
 - e. string height
 - f. sight window
 - g. bowstring
 - h. quiver
 - i. arrow tip
 - j. crest
 - k. index or cock feather
 - l. arrow nock
2.
 - a. A bow that has two curves.
 - b. A certain number of arrows shot before retrieving.
 - c. A certain combination of ends shot at certain distances.
 - d. High place on the face where the string hand rests at full draw.
 - e. Position where string hand is below chin at full draw.
3. Between the forefinger and the middle finger.
4.
 - a. 9
 - b. 7
 - c. 5
 - d. 3
 - e. 1
 - f. 5
 - g. 4
 - h. 3
 - i. 5
 - j. 4
 - k. 3
 - l. 2
 - m. 1
5. See page 17.
6. See pages 17-20.

Specialists' Regions

Northwest Area

Louis F. Diebold
P.O. Box 26
Savannah, MO 64485
816/324-4672

Northeast Area

Wayne Martin
1710 E. McPherson
Kirksville, MO 63501
816/665-8075

St. Louis Area

Patti Baker
St. Louis Sub-Office
1221 South Brentwood Blvd.
St. Louis, MO 63117
314/726-6800

Southeast Area

Stephen J. Wilson
318 East Neal Street
Jackson, MO 63755
314/243-1143

Southwest Area

Richard Flint
214 West Pleasant
Aurora, MO 65605
417/678-2445

Kansas City Area

Jeanne Marolf
Kansas City Sub-Office
Brywood Shopping Center
8616 East 63rd Street
Kansas City, MO 64133
816/356-2280

Lake City Training Center and Range

Lloyd Williams
Kansas City Sub-Office
Brywood Shopping Center
8616 East 63rd Street
Kansas City, MO 64133
816/356-2280

Outdoor Skills Education Specialists and Education Consultants will assist you in obtaining materials and scheduling equipment and films that are available from the Department of Conservation. They also offer workshops to provide training in outdoor skills and conservation education.



Central Area

Robert D. Staton, Jr.
303B North High Street
California, MO 65018
314/796-2669

Consultants' Regions

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408 South Polk
Albany, MO 64402
816/726-3677

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Route 1, Box 21
Gibbs, MO 63540
816/332-7278

District 3

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1250 NE Tudor Road
Lee's Summit, MO 64063
816/524-6196

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620 Hillcrest Drive
Knob Noster, MO 65336
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